Trinity River Channel Rehabilitation Sites:
Douglas City (River Mile 93.6-94.6) and Lorenz Gulch (River Mile 89.4-90.2)

Final Environmental Assessment/Initial Study
DOI-BLM CA-N060-2013-040-EA and TR-EA0113

May 2013

This document has been split into three parts to reduce the size of the document for distribution via the internet.

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To tier to:

The Trinity River Mainstem Fishery Restoration Environmental Impact Statement

And

The Channel Rehabilitation and Sediment Management for Remaining Phase 1 and Phase 2 Sites Master Environmental Impact Report (State Clearinghouse # 2008032110)

Previous Rehabilitation Site Photos (Pre- construction, During Construction, and Post-construction)

May 2013

California Lead Agency for CEQA
North Coast Regional Water Quality Control Board

Project Proponent and Federal Lead Agency for NEPA
Trinity River Restoration Program
U. S. Department of the Interior
Bureau of Reclamation

Federal Co-lead Agency for NEPA
U. S. Department of Interior, Bureau of Land Management

Project Proponent's Consultant
North Wind Services, LLC

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Acronyms and Abbreviations

AEAM	Adaptive Environmental Assessment and Management
afa	acre feet annually
APE	Area of Potential Effect
Basin Plan	Water Quality Control Plan for the North Coast Region
BFE	base flood elevation
BLM	U.S. Bureau of Land Management
BMP	best management practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	methane
CHP	California Highway Patrol
CNDDB	California Natural Diversity Database
CO_2	carbon dioxide
CRHR	California Register of Historic Resources
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
CY	cubic yard
dB	logarithmic decibel
dBA	"A-weighted" decibel scale
dbh	diameter at breast height
DCY	Douglas City
DWR	Department of Water Resources
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELJ	Engineered Log Jam
EPA	Environmental Protection Agency
ESL	Environmental Site Limit
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FACW	Facultative Wetland Plants
FAC	Facultative Plants
FACU	Facultative Upland Plants

FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
fps	feet per second
GHG	greenhouse gas
GIS	geographic information system
HAP	Hazardous Air Pollutant
HEC-RAS	Hydraulic Engineering Center River Analysis System
HVT	Hoopa Valley Tribe
IAP	Integrated Assessment Plan
IBLA	Interior Board of Land Appeals
IC	Indian Creek
IS	Initial Study
KMP	Klamath Mountains Province
KOP	key observation point
L_{dn}	day-night average sound level
LRZ	Lorenz Gulch
LRMP	Land and Resource Management Plan
LWD	large woody debris
MoA	Memorandum of Agreement
MBTA	Migratory Bird Treaty Act
MDB&M	Mount Diablo Base and Meridian
MFF	maximum fishery flow
mm	millimeter
MMRP	Mitigation Monitoring and Reporting Program
MSA	Magnuson-Stevens Fishery Conservation and Management Act
msl	mean sea level
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCAB	North Coast Air Basin
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NI	No Indicator
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
NTU	nephelometric turbidity unit
OBL	Obligate Wetland Plants
OHWM	ordinary high water mark
PA	Programmatic Agreement
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
PRC	Public Resources Code

Proposed Project	Douglas City and Lorenz Gulch Rehabilitation Sites
Q	flow rate (typically expressed in cfs)
Q_s	summer base flow
$Q_{1.5}$	1.5-year return interval design flow
Q_{100}	100-year flood flow
Reclamation	U.S. Bureau of Reclamation
Regional Water Board	North Coast Regional Water Quality Control Board
RM	river mile
RMP	Resource Management Plan
ROD	Record of Decision
SAB	Scientific Advisory Board
SHPO	State Historic Preservation Office
SMARA	Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SONCC	Southern Oregon/Northern California Coast
SR	State Route
SRA	shaded riverine aquatic
STNF	Shasta-Trinity National Forest
SWPPP	Storm Water Pollution Prevention Plan
TAC	Toxic Air Contaminant
TCRCD	Trinity County Resource Conservation District
TMC	Trinity Management Council
TRD	Trinity River Division
TRFEFR	Trinity River Flow Evaluation Final Report
TRGA	Trinity River Guides Association
TRRP	Trinity River Restoration Program
UPL	Obligate Upland Plants
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VAU	visual assessment unit
VFD	volunteer fire department
VRM	Visual Resource Management
WSE	water surface elevation
WHR	Wildlife Habitat Relationships
WSRA	Wild and Scenic Rivers Act
YT	Yurok Tribe

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Chapter 1

1 INTRODUCTION AND BACKGROUND

1.1 Overview

The United States Department of Interior (USDI) Bureau of Reclamation (Reclamation) proposes to conduct mechanical channel rehabilitation activities on the mainstem Trinity River downstream of Lewiston Dam at the Douglas City (River Mile [RM] 93.6-94.6) and Lorenz Gulch (RM 89.4-90.2) Rehabilitation Sites. Work at the Douglas City site includes some activities within the downstream end of the Indian Creek Rehabilitation Site boundary (immediately adjacent to the Douglas City site) that was originally completed in 2007. This work area is now included in the Douglas City Rehabilitation Site boundary. The activities proposed at the Douglas City and Lorenz Gulch sites are hereafter referred to as the "Proposed Project" or "Project." Project work would be part of the ongoing Trinity River Restoration Program's (TRRP) work to restore the anadromous fishery of the Trinity River. The proposed river channel rehabilitation activities would recreate complex salmon and steelhead habitat, enhance natural river processes for the benefit of wildlife, and provide conditions suitable for reestablishing native riparian vegetation. Details of the Proposed Project are contained in Chapter 2 and mitigation measures associated with the Proposed Project are listed in Appendix A.

The fundamental purpose of the TRRP is to restore historic river processes to the river via implementation of the 2000 Record of Decision (ROD) for the Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report (Trinity River FEIS/EIR). It is the intent of the TRRP to recreate a properly functioning river, albeit on a smaller scale, in order to increase naturally spawning anadromous fish populations to levels that existed prior to construction of the Lewiston and Trinity Dams. The target reach for Trinity River restoration is the approximately 40-mile length of river downstream of Lewiston Dam to the confluence of the North Fork Trinity. In this reach, the ROD outlined six integral components for execution:

- Implementation of a variable annual flow regime according to recommendations provided in the Trinity River Flow Evaluation Report (1999);
- Mechanical channel rehabilitation;
- Fine and coarse sediment management;
- Watershed restoration;
- Infrastructure improvement; and
- Adaptive environmental assessment and management.

In general, the TRRP approach to channel rehabilitation is to reconnect the river with its floodplain. This reconnection requires selective removal of terraces and riparian berms (i.e., berms that are anchored with woody vegetation and consolidated sand deposits) that developed after the Lewiston and Trinity Dams were completed and historic peak scouring flows were lost. Along with berm removal, the approach involves physical alteration of floodplains to inundate more frequently, placement of large wood, and removal of riparian vegetation at strategic locations to promote the alluvial processes necessary for the restoration and maintenance of complex riverine habitats.

This environmental review document was prepared by Reclamation, in coordination with the USDI Bureau of Land Management (BLM), a federal land manager at the Proposed Project sites and federal co-lead for National Environmental Policy Act (NEPA) review. These federal agencies worked with the North Coast Regional Water Quality Control Board (Regional Water Board), as the California state lead agency, to analyze the potential impacts of the proposed activities according to NEPA and California Environmental Quality Act (CEQA) guidelines. The results of these analyses are recorded in this Project Environmental Assessment/Initial Study (EA/IS), which meets all NEPA requirements for environmental analyses and disclosure of potential impacts.

The EA portion of this document tiers from the 2000 Trinity River FEIS/EIR (USFWS et al. 2000a). However, Trinity County, the CEQA lead agency for the Trinity River FEIS/EIR chose not to "certify" the EIR portion of the 2000 document. Therefore, the EIR portion of the Trinity River FEIS/EIR was not available for the CEQA portion of this document, or other earlier TRRP CEQA documents, to "tier" from. Consequently, four joint EA/EIRs were completed to analyze TRRP channel rehabilitation projects between 2004 and 2008[1]. Based upon the similarity of these projects and their environmental impacts, and agreement that future TRRP projects would have similar impacts, a separate programmatic CEQA document, the Master Environmental Impact Report for Channel Rehabilitation and Sediment Management Activities for the Remaining Phase 1 and Phase 2 Sites (Trinity River Master EIR; Regional Water Board and Reclamation 2009) was developed. The Regional Water Board acted as lead agency for the Trinity River Master EIR and site specific EA/EIR (State Clearinghouse number 2008032110). The Trinity River Master EIR provides a discussion of the existing conditions, environmental impacts, and mitigation measures required to comply with CEQA (California Public Resources Code [PRC], Section 21000 et seq.). In addition to addressing direct and indirect impacts associated with the Proposed Project and alternatives, the Trinity River Master EIR addresses cumulative and growth-inducing impacts that could be associated with activities at the remaining Phase 1 and Phase 2 sites.

The Regional Water Board certified the Trinity River Master EIR on August 25, 2009. Phase 2 sites, like the Proposed Project, are now eligible for enrollment and CEQA coverage following the completion of any subsequent project-specific environmental analysis required to supplement the programmatic level review contained in the Trinity River Master EIR. Under California Code of Regulations, Title 14, Section 15177, after a Master EIR has been prepared and certified, subsequent projects, which the lead agency determines as being within the scope of the Master EIR, will be subject to only limited environmental review.

The preparation of a new environmental document and new written findings will not be required if, based on a review of the IS prepared for the subsequent project, the lead agency determines, on the basis of written findings, that no additional significant environmental effect will result from the proposal, no new additional mitigation measures or alternatives are required, and that the project is within the scope of the Master EIR. Whether a subsequent project is within the scope of the Master EIR is a question of fact to be determined by the lead agency based upon a review of the IS to determine whether there are additional significant effects or new additional mitigation measures or alternatives required for the subsequent project that are not already discussed in the Master EIR. If the Regional Water Board requires additional analysis, site-specific CEQA environmental

[1] Hocker Flat (Reclamation and California Department of Water Resources 2004), the Canyon Creek Suite (Reclamation and Regional Board 2006), Indian Creek (Reclamation and Trinity County 2007), and Lewiston-Dark Gulch (Reclamation and Trinity County Resource Conservation District 2008).

documentation is required. This Proposed Project EA/IS contains a site-specific Project description and other information required to apply for enrollment under General Permit R1-2010-0028 for Trinity River channel rehabilitation activities, which the Regional Water Board will consider in making its determination and approval decision.

This EA/IS for the Proposed Project provides site-specific details for environmental impact analyses and has been prepared to comply with NEPA (42 United States Code [USC], Section 4321 et seq.) and CEQA (California PRC, Section 21000 et seq.). The Trinity River Master EIR meets the elements required for a Program EIR pursuant to California Code of Regulations, Title 14 (Natural Resources), Section 15168. The Trinity River Master EIR provides programmatic CEQA level review, as the Trinity River FEIS/EIR serves under NEPA, from which site-specific projects may tier. Therefore the Douglas City and Lorenz Gulch sites are considered subsequent site-specific projects that are tiered to the Trinity River Master EIR. This combined NEPA/CEQA document evaluates the environmental impacts of the proposed channel rehabilitation and sediment management activities at the project-specific level for the Proposed Project.

1.2 Regional Setting

The Trinity River originates in the rugged Salmon-Trinity Mountains of northern California in the northeast corner of Trinity County. The Trinity River Basin encompasses the majority of Trinity County and the easternmost portion of Humboldt County (see Figure 1). The mainstem Trinity River flows a total of 170 miles from its headwaters to its confluence with the Klamath River at Weitchpec, on the Yurok Indian Reservation. The Trinity River passes through Trinity County, Humboldt County, the Hoopa Valley Indian Reservation, and the Yurok Indian Reservation. Much of the basin is composed of federal lands managed by the United States Forest Service (USFS), BLM, and, to a lesser extent, Reclamation. Ownership along the Trinity River corridor is a mixture of public, tribal, and private lands.

The Trinity River flows generally southward until impounded by Trinity Dam and Lewiston Dam. The river drains a watershed of approximately 2,965 square miles; about one-quarter of this area is above Lewiston Dam. From Lewiston Dam, the river flows westward for 112 miles until it enters the Klamath River near the town of Weitchpec, 43.5 miles upstream from the Pacific Ocean. The Klamath River flows northwesterly for approximately 40 miles from its confluence with the Trinity River before entering the Pacific Ocean.

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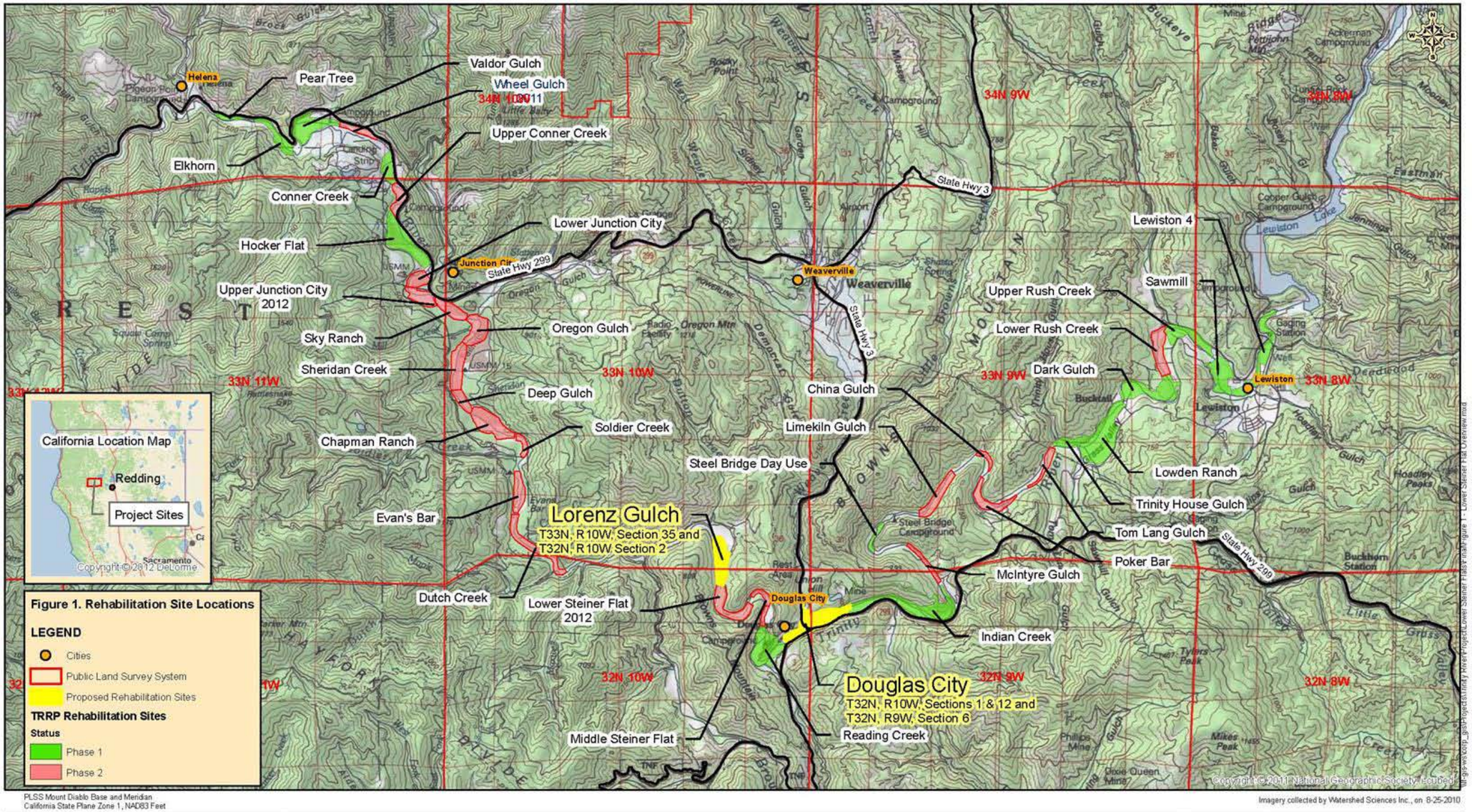

Figure 1. Proposed Project Location and Relationship to Other TRRP Sites.

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Topography of the Trinity River Basin is predominantly mountainous with a heavily forested basin. Elevations in the watershed range from 8,888 feet above mean sea level (msl) at Sawtooth Mountain in the Trinity Alps to 300 feet above msl at the confluence of the Trinity and Klamath rivers. Land use within the Trinity River Basin is greatly influenced by the large amount of public, tribal, and private lands, much of which is used for timber production and other natural resource-related uses. Two scenic byways, State Route 299 (SR-299) and SR-3, cross the county. SR-299 is the primary travel corridor through Trinity County, connecting the Central Valley with the coastal communities of Humboldt County. The area's numerous lakes and rivers provide many recreational opportunities, including fishing and boating. Private uses along the Trinity River are generally limited to scattered residential and commercial development.

1.3 Project Location

The general setting for the TRRP is within the 40-mile reach of the mainstem Trinity River between Lewiston Dam and the confluence of the North Fork Trinity. The entire stretch is designated under the National and California State Wild and Scenic River Systems to preserve its Outstandingly Remarkable Values, which include the river's free flowing condition, anadromous and resident fisheries, outstanding geologic resource values, scenic values, recreational values, cultural and historic values, and the values associated with water quality. The segment of the Trinity River encompassed by the Proposed Project is classified and managed as a "Recreational" reach by the BLM and the Shasta-Trinity National Forest (STNF). Lands under BLM administration are managed in accordance with BLM's Redding Resource Management Plan (RMP). See Section 3.2.1.3, Relevant Land Use Plan, of this EA for more details on the BLM's land use management plan.

The Trinity River Master EIR includes figures depicting the location of all of the rehabilitation projects proposed by the TRRP on the Trinity River. The Douglas City Rehabilitation Site (RM 93.6-94.6) is a 141.14-acre site located immediately downstream and upstream of the SR-299 Bridge, also called the Douglas City Bridge. The Douglas City site begins approximately 0.4 miles downstream of the Douglas City Bridge and extends upstream 1 mile to RM 94.6. The downstream portion of the site is between Douglas City, California and SR-3, while the upstream portion runs adjacent to SR-299. The Weaver Creek delta is within the Douglas City Project boundary entering the Trinity River at RM 94.0. This site is found on *Weaverville, California* 7.5-minute U.S. Geological Survey (USGS) quadrangle, in Township 32 North, Range 10 West, Sections 1 and 12, and Range 9 West, Section 6 Mount Diablo Base and Meridian (MDB&M). The river elevation at this site is approximately 1,600 feet above msl (Figure 1).

The current Douglas City Project boundary encompasses the Trinity River Master EIR Douglas City site, downstream of the Douglas City Bridge, and a portion of the Indian Creek Rehabilitation Site, that was constructed by the TRRP in 2007, upstream of the Douglas City Bridge. The Douglas City Rehabilitation Site environmental site limit (ESL) was expanded to include the downstream portion of the Indian Creek site to implement recommendations from the TRRP's Scientific Advisory Board (SAB) for increasing restoration efficacy, to enhance riparian areas, and to address local fishing community concerns. At the upstream portion of the Project, bank naturalization work would occur that is similar to actions proposed, but not completed, in the original Indian Creek Project that was constructed in 2007.

This site can be accessed from Weaverville by traveling east on SR-299 about 5.0 miles to the Douglas City turnoff (Steiner Flat Road). Work downstream of the Douglas City Bridge would primarily be conducted on river right (looking downstream), however, some placement of materials (e.g., logs and boulders with a crane) may be conducted from river left. Work upstream of the bridge would occur on both sides of the river. Access to the downstream portion from SR-299 is reached by following Steiner Flat Road for several hundred feet until it forks, then via Riverview Drive. The downstream portion is located between Riverview Drive and the left bank of the Trinity River, and can be accessed on foot from a parking area. Entrance to the portion of the site above the Douglas City Bridge is via an access road east of SR-299 near Weaver Creek. The Douglas City ESL and responsible land managers are shown on Figure 2.

The Lorenz Gulch Rehabilitation Site is an 83.82 acre site located on Steiner Flat Road just downstream of the Steiner Flat primitive campground (RM 89.4-90.2). The Project area begins 22.0 miles downstream of Lewiston Dam and extends 0.8 miles to approximately 0.2 miles above the Dutton Creek confluence. The entire site is managed by the BLM, although there are private landowners on the right bank just outside the Project area beginning at approximately RM 89.7 and continuing downstream. The upper half of the Lorenz Gulch site is dominated by a steep hill slope and bedrock on the left bank, and a primitive boat access/gravel bar (Hidden Bar) on river right. This gravel bar marks the beginning of a previously constructed side channel built in 1990. The site is found on the *Weaverville, California* 7.5-minute USGS quadrangle, Township 32 North, Range 10 West, Section 2, and Township 33 North, Range 10 West, Section 35 MDB&M (Figure 3). The river elevation at this site is approximately 1,600 feet above msl. The site can be reached from Douglas City by driving approximately 2.8 miles on Steiner Flat Road. Access to the river-left portion (the south side) of the site requires a boat. The Lorenz Gulch ESL and responsible land managers are shown on Figure 3.

The current Project site boundaries are shown on Figures 2 and 3. TRRP staff, with interdisciplinary review from the Trinity Management Council (TMC) technical staff, developed the site boundaries to incorporate the rehabilitation activities that were considered. For the Proposed Project, these activities include removal of encroaching riparian vegetation, rehabilitation of floodplain and in-channel alluvial features (e.g., side-channels and large wood and mixed wood-boulder habitat and hydraulic structures) and construction of off-channel habitat for aquatic- and riparian-dependent species, and rehabilitation of overstocked (suppressed-growth, densely forested) upland habitat.

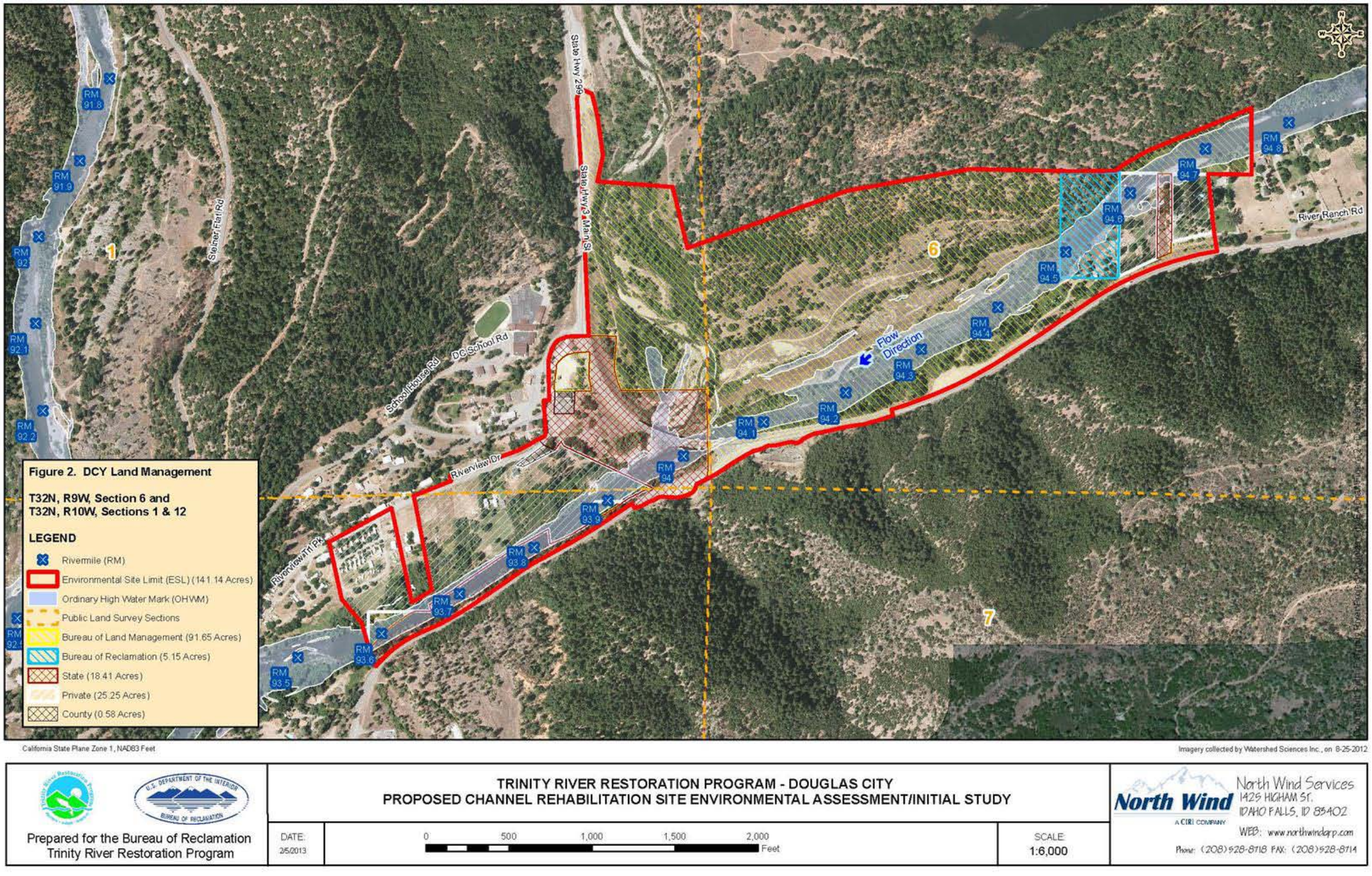

Figure 2. Land Management and Boundaries of the Douglas City Rehabilitation Site.

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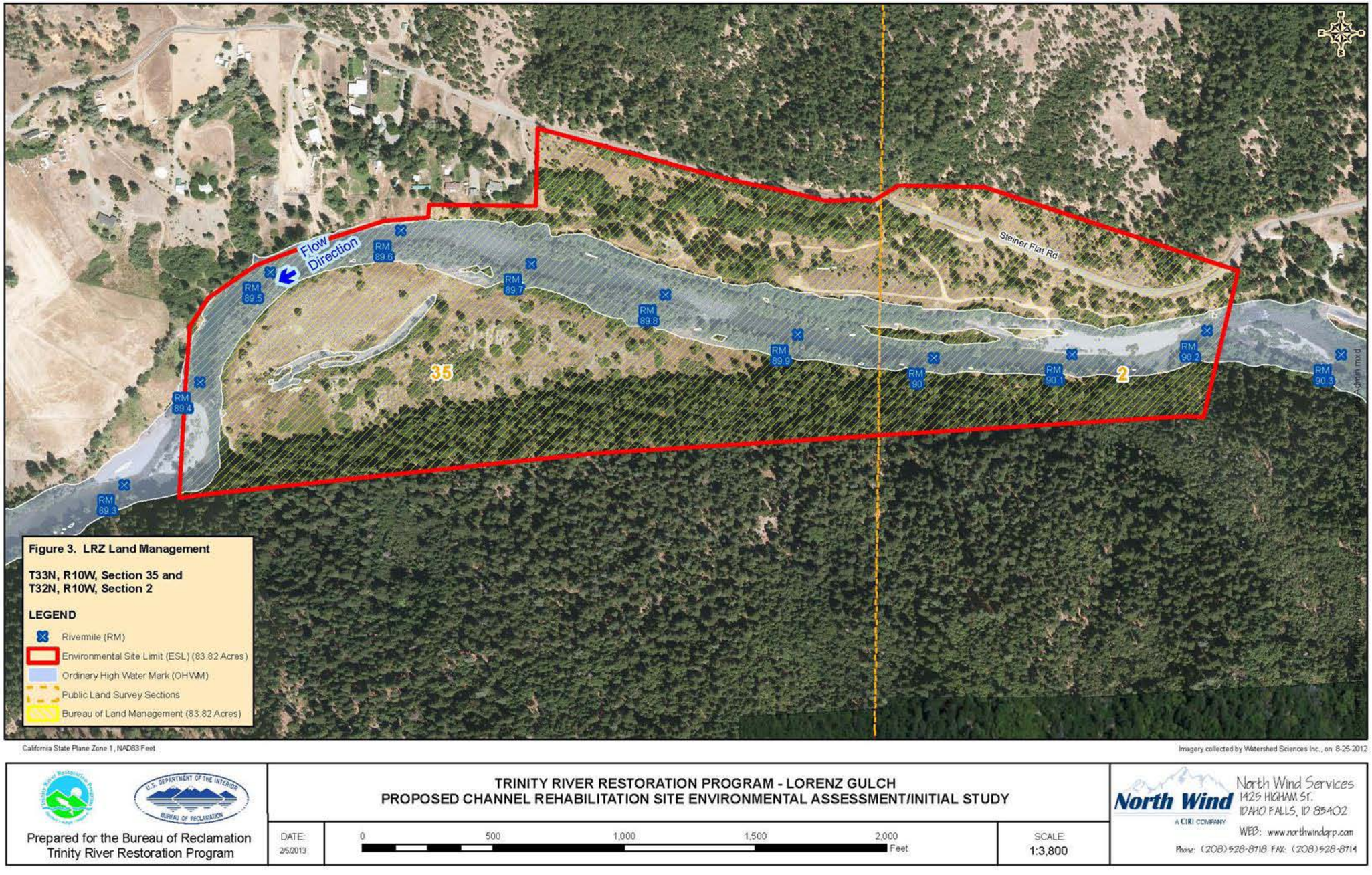

Figure 3. Land Management and Boundaries of the Lorenz Gulch Rehabilitation Site.

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1.4 Project History and Background

Completion of Trinity Dam and Lewiston Dam in 1964 blocked anadromous fish access to habitat upstream of Lewiston Dam restricting them to habitat below the dam. The location of the Trinity River relative to other components of the Central Valley Project (CVP) is shown on Figure 1-1 in the Trinity River Master EIR. Trans-basin diversions from Lewiston Lake to the Sacramento River Basin altered the hydrologic regime of the Trinity River, diminishing annual flows by up to 90 percent. Consequences of diminished flows included encroachment of riparian vegetation, establishment of riparian berms, and fossilization of point bars at various locations along the river, as far downstream as the North Fork Trinity River. These geomorphic changes reduced the diversity of riparian age classes and riparian vegetation species, impaired floodplain access, and adversely affected fish habitat.

In 1981, in response to declines in salmon and steelhead populations, the Secretary of the Interior directed the U.S. Fish and Wildlife Service (USFWS) to initiate a 12-year flow study to determine the effectiveness of flow restoration and other mitigation measures for impacts of the Trinity River Division (TRD) of the CVP. Then, in 1984, Congress enacted the Trinity River Fish and Wildlife Program to further promote and support management and fishery restoration actions in the Trinity River Basin. Under this program, nine pilot bank rehabilitation projects between Lewiston Dam and the North Fork Trinity River were implemented between 1991 and 1993, in addition to other actions. In 1992, Congress enacted the Central Valley Project Improvement Act (CVPIA). One purpose of the CVPIA (Section 3406(b)(23)) was to protect, restore, and enhance fish, wildlife, and associated habitats in the Trinity River Basin. The act also directed the Secretary of the Interior to finish the 12-year Trinity River Flow Evaluation Report and to develop recommendations "regarding permanent instream fishery flow requirements, TRD operating criteria, and procedures for the restoration and maintenance of the Trinity River fishery." The Trinity River Flow Evaluation Final Report (TRFEFR) was ultimately published in 1999 by the USFWS and the Hoopa Valley Tribe (HVT), providing a framework for restoration activities below Lewiston Dam as well as the basis for the preferred alternative in the concurrent programmatic environmental analysis.

In 1994, the USFWS as the NEPA lead agency and Trinity County as the CEQA lead agency began the public process for developing the Trinity River Mainstem Fishery Restoration EIS/EIR. The ROD for the Trinity River FEIS/EIR (December 19, 2000; USDI 2000) directed USDI agencies to implement the Flow Evaluation Alternative, which was identified as the Preferred Alternative in the Trinity River FEIS/EIR (USFWS et al. 2000a). However, the EIR portion of the FEIS/EIR was not certified by Trinity County. The ROD set forth prescribed Trinity River flows for five water-year types: extremely wet (815,200 acre-feet annually [afa]), wet (701,000 afa), normal (646,900 afa), dry (452,600 afa), and critically dry (368,600 afa). The flows prescribed by the 2000 ROD are deemed to constitute the "existing [hydrological] environment" for CEQA purposes, and are considered the basis for the environmental analysis under both NEPA and CEQA.

The Trinity River Master EIR (Regional Water Board and Reclamation 2009) includes a brief chronology summarizing the most pertinent management actions that have occurred relevant to the Trinity River Basin between 1938 and 2008 (Section 1.4.4., page 1-8). Additional details concerning the legislative and management history can be found in the Trinity River FEIS/EIR (USFWS et al.

2000a) and the EA/Final EIRs for TRRP projects constructed between 2005 and 2008[2]. These documents are on file at the TRRP office in Weaverville, California, available on the TRRP website (www.trrp.net), and at the Weaverville public library. The Trinity River Master EIR (Section 1.4.5, pages 1-10 through 1-15) also contains a summary of the various restoration activities that have been undertaken since the signing of the ROD, as well as brief discussions of other watershed restoration programs and activities occurring within the basin; additional information is available on the TRRP website[3].

The TRRP acts under guidance of the TMC, a collaborative board of natural resource managing agencies, tribes, and local government. TMC member agencies include Reclamation, USFWS, National Marine Fisheries Service (NMFS), USFS, HVT, Yurok Tribe (YT), the California Natural Resources Agency represented by the California Department of Fish and Wildlife (CDFW) and the California Department of Water Resources (DWR), and Trinity County. Technical experts associated with each of these entities participate in the design and review of the rehabilitation sites.

An integral part of the TRRP is the implementation of an Adaptive Environmental Assessment and Management (AEAM) Program. As described in the Trinity River FEIS/EIR, an AEAM process is important for management of complex physical and biological systems like the Trinity River.

The ROD for the Trinity River FEIS/EIR specified that mechanical channel rehabilitation activities would be implemented on the mainstem Trinity River between Lewiston Dam and the North Fork Trinity River. Conceptually, the overall intent of these activities was to selectively remove fossilized berms (berms that have been anchored by extensive woody vegetation root systems and consolidated sand deposits); revegetate and provide conditions for regrowth/sustenance of native riparian vegetation; and reestablish alternate point bars and complex fish habitat similar in form to those that existed prior to the construction of the TRD. Since development of the ROD, the TRRP has included large-scale use of wood (large woody debris – LWD) and skeletal bar features to restore habitat and geomorphic form and function within the Trinity River.

The Trinity River FEIS/EIR identified 44 potential channel rehabilitation sites and three potential side-channel sites for consideration by the TRRP (USFWS et al. 2000a). These sites were originally prescribed for rehabilitation in the Trinity River Flow Evaluation Report (USFWS and HVT 1999) and included in the preferred alternative identified in the ROD. Site selection was based on identifying locations where the maximum amount of habitat for native anadromous fishes could be initiated through construction projects, and then enhanced or maintained by a combination of river flows plus coarse sediment augmentation. Consequently, the original sites were chosen based largely on the existence of riparian berms and where channel morphology, sediment supply, and high-flow hydraulics would encourage a dynamic alluvial channel. The ROD prescribed rehabilitation efforts at these sites to be implemented in phases. Early TRRP planning efforts resulted in the identification of two phases, Phase 1 and Phase 2. Subsequently, during ROD implementation by the TRRP, the originally identified sites were revisited and redefined. The Trinity River Master EIR (Tables 1-1, 1-2, and 1-3) describes the relationship between sites identified in the ROD and sites defined subsequent to the ROD. Ultimately, sites at which rehabilitation activities could be implemented were selected using criteria that identified physical features and

[2] Hocker Flat (Reclamation and California DWR 2004), the Canyon Creek Suite (Reclamation and the Regional Board 2006), Indian Creek (Reclamation and Trinity County 2007), and Lewiston-Dark Gulch (Reclamation and TCRCD 2008).
[3] On the TRRP website go to http://www.trrp.net/?page_id=409

processes such as channel morphology, sediment supply, and high-flow hydraulics that would encourage a dynamic alluvial channel. Factors such as property ownership, access to the sites, and engineering and economic feasibility were also considered in the site selection process.

In 2002 the TRRP office was opened in Weaverville specifically to implement the components of the ROD. The first accomplishment of the TRRP was to upgrade infrastructure and bridges so that recommended ROD flows of up to 11,000 cfs could be safely passed. Over 100 potable water wells that were impacted by increased river flows were enhanced, four river crossings (bridges) were improved, one house was moved, and many pieces of infrastructure were upgraded (e.g., decks and outbuildings moved, roads and drives raised) to eliminate impacts of high flows. This work was done through negotiation with landowners to protect physical structures and maintain human safety. Eminent domain was not used. The first of the post-ROD channel rehabilitation projects were implemented at sites downstream of Canyon Creek (e.g., Hocker Flat and the Canyon Creek suite), where natural high flows would maintain constructed alluvial features while ROD flows were contested in court. After the ROD was upheld in November 2004 by the United States Court of Appeals for the Ninth Circuit, channel rehabilitation designs focused on modifying alluvial features (e.g., berm removal), at locations where pronounced fossilized riparian berms had developed in response to changes in the flow regime and sediment flux that resulted from construction and operation of the TRD.

In 2006, Hocker Flat, the first channel rehabilitation project was completed. Although berm removal and reforming alluvial features continue to be emphasized in channel rehabilitation efforts, the restoration of alluvial processes, coupled with the creation of high-value juvenile fish margin and side-channel habitat (low velocity, shallow, and in close proximity to cover; Alvarez et al. 2010), are now emphasized by the TRRP in order to increase habitat for anadromous fish. This approach is consistent with the recognition in the Trinity River FEIS/EIR that the rehabilitation sites exhibit a variety of conditions that require site-specific designs. The Trinity River FEIS/EIR also acknowledged that, in many instances, an entire site would not require treatment to facilitate rehabilitation. This is because strategically treating certain areas is expected to result in fluvial processes that will promote the formation and maintenance of complex fish habitat (e.g., alternating channel bars) in both treated and untreated sections of the river. Phase I of the channel rehabilitation component of the ROD (24 sites of the 47 enumerated in the FEIS) was completed in 2010.

Under the Implementation Plan for the Preferred Alternative of the Trinity River EIS/EIR (contained in Appendix C of the FEIS/EIR), an evaluation of the Phase I channel rehabilitation projects was described. The Implementation Plan states that:

"*Twenty-four sites are proposed during the first three years of construction if adequate funding is available. Additional projects will be constructed after evaluation of the first series of projects under Adaptive Environmental Assessment and Management. This evaluation will be ongoing beginning with construction of the first projects, but an interim period without construction activities may be necessary to fully evaluate the effectiveness of project designs and the effect of the new flow regime before beginning construction on the remaining sites.*"

Based on this, several non-profit organizations have requested that the TRRP stop implementation of their channel rehabilitation and gravel augmentation projects until a "Phase I review" is completed. However, the ROD emphasizes the need for rapid implementation of the program so

that synergistic benefits of the work may quickly restore river conditions for fish and allow for expansion of depleted populations. The TRRP's SAB and an external board of experts have conducted the Phase 1 review and a final report is expected in 2013. Preliminary reporting by the SAB on TRRP activities from 2001 through 2010 has found that many of the TRRP channel rehabilitation projects are performing well to increase river complexity and fish habitat and that more recent projects are generally performing better than earlier channel rehabilitation projects. In order to realize the rapid systemic change in river form and function required to create juvenile rearing habitat, and ultimately to increase returning adults of all native salmonids, the members of the TMC have directed the TRRP to continue with implementation of rehabilitation projects, which are believed to be non-controversial, while simultaneously completing Phase 1 analyses and reporting. This schedule would allow the TRRP to continue mainstem restoration as efficiently as possible, while maintaining project momentum and funding.

To date, the TRRP has utilized adaptive management in its project implementation and project design process; however, local fishing guides (e.g., the Trinity River Guides Association: TRGA) have noted that TRRP construction and gravel augmentation has been filling adult holding areas. Consequently the SAB has been reviewing the Proposed Projects, and will continue to provide input so that the benefits of the Phase I review may inform and benefit implementation of the 2013 projects. The Proposed Project has considered the need to maintain adult holding habitat in their designs and is expected to minimally impact these areas. Scouring and deepening are expected in areas near log jams (unless they are completely underlain by bedrock), which should result in development of additional holding habitat. Use of small diameter material (e.g., fines and gravel < 4 inches) is planned for use in establishing vegetated islands and not for scour as mobile gravel, and in-river work and crossings have been minimized.

Based on scientific need and requests from local fishermen, the TRRP initiated a monitoring program in 2010 to evaluate river bathymetry (including adult holding locations) within the 40-mile reach between Lewiston and the North Fork Trinity River. Boat based sonar and global positioning software allowed quantification of pool volume and depths pre- and post-construction (at some sites) and pre- and post-flow release (e.g., pre- and post-2011 spring 11,000 cubic feet per second [cfs] flow). Preliminary results from this monitoring indicate that holes are filling and scouring in the restoration reach and that site specific results are dependent on location. A final report will quantitatively evaluate how pools and other aquatic habitats have physically changed over this period. However, monitoring results have assisted the project designers to incorporate activities at Douglas City and Lorenz Gulch to help maintain pools and adult holding habitat in the Proposed Project.

1.5 Purpose and Need

NEPA regulations require that an EA briefly specify the need that the agency is responding to in proposing the various alternatives, including the Proposed Project (40 Code of Federal Regulations [CFR], Section 1508.9(a)). Similarly, CEQA requires that the IS include a statement of the objectives to be achieved by a Proposed Project (CEQA Guidelines, Section 15124(b)). Specific Project objectives are discussed in Chapter 2 of this document.

Overall, the purpose of the TRRP is to implement the 2000 ROD. The TRRP is working to provide increases in habitat for all life stages of naturally produced anadromous fish native to the Trinity

River in the amounts necessary to reach congressionally mandated goals. The strategy is to create habitat for native anadromous fish, while also ensuring that habitat complexity and quantity increases as the alluvial processes of the Trinity River are enhanced or restored in a manner that would perpetually maintain fish and wildlife resources (including threatened and endangered species) and the river ecosystem. The Proposed Project would continue to advance the implementation efforts of the TRRP and provides the opportunity to:

- Increase the diversity and amount of habitat for salmonids, particularly habitat suitable for rearing;
- Increase rearing habitat for juvenile salmonids, including coho and Chinook salmon and steelhead;
- Ensure that the flows prescribed in the ROD would not increase the likelihood of flood-related impacts to public resources and private property within the Project boundaries;
- Increase the structural and biological complexity of habitat for various species of wildlife associated with riparian habitats;
- Increase hydraulic and fluvial geomorphic diversity and complexity; and
- Measure/demonstrate the ecological response to changes in flow regimes, morphological features, and aquatic, riparian, and upland habitats.

The underlying need for the Proposed Project is to restore fish populations to pre-dam levels and restore dependent fisheries, including those held in trust by the federal government for the HVT and YT. This need results from:

- Requirements in the ROD (USDI 2000) to restore the Trinity River fishery through a combination of higher releases from Lewiston Dam (up to 11,000 cfs), floodplain infrastructure improvements, channel rehabilitation projects, fine and coarse sediment management, watershed restoration, and an AEAM Program; and
- The expectation that the AEAM Program would continue to incorporate the experience provided through the planning, design, and implementation of the Proposed Action into future restoration and rehabilitation efforts proposed by the TRRP.

1.6 Purpose of This Document

Similar to the Trinity River Master EIR (Regional Water Board and Reclamation 2009), this site-specific EA/IS for the Proposed Project at the Douglas City and Lorenz Gulch Rehabilitation Sites has been prepared to comply with NEPA (42 USC 4321 et seq.) and CEQA (California PRC, Section 21000 et seq.). Both statutes generally require that governmental agencies disclose information about proposed activities that may affect the environment, evaluate the potential environmental impacts of their proposed actions before making formal commitments to implement them, and involve the public in the environmental review process. This combined NEPA/CEQA document evaluates the environmental impacts of the Proposed Project, recommends mitigation measures to minimize impacts, and is designed to facilitate lawful implementation under all applicable laws.

CEQA allows for preparation of a Master EIR that analyzes a series of related actions that are characterized as one large project or program, such as the channel rehabilitation and sediment management activities proposed by the TRRP. The Trinity River Master EIR meets the elements required for a Program EIR pursuant to California Code of Regulations, Title 14, Section 15168. A Master EIR evaluates at a programmatic level the direct and indirect environmental impacts,

cumulative impacts, growth-inducing impacts, and irreversible significant effects on the environment of subsequent specific projects. A project-level EIR evaluates the environmental impacts of a specific project (CEQA Guidelines, Section 15161), focusing primarily on the changes in the environment that would occur because of project implementation and evaluates all phases of a particular project (i.e., planning, construction, and operation). A Master EIR forms the basis for analyzing the effects of subsequent projects (CEQA Guidelines, Section 15175, et. seq.), a process known as "tiering." Tiering, which is recognized under both NEPA and CEQA, refers to the practice of covering general matters in broader scope environmental documents and focusing subsequent documents on the issues germane to the site-specific actions (40 CFR 1508.28). Tiering is appropriate when a sequence of analyses progresses from a broad, conceptual, or planning-level review over a wide area or program to a project-specific and site-specific analysis. Tiering helps the lead agencies focus on issues that are "ripe" for decision, while excluding from consideration issues already decided or not yet ripe (CEQA Guidelines, Section 15385). The general analysis in the broader document is incorporated by reference into the subsequent documents, meaning that the information in the broader document does not need to be repeated in subsequent documents.

Because the Trinity River Master EIR provides programmatic level review from which site-specific projects may tier, the Proposed Project level analysis in this EA/IS is tiered from that document. In addition, the EIS portion of the Trinity River FEIS/EIR functions as a project-level NEPA document for policy decisions associated with managing Trinity River flows and as a programmatic NEPA document providing "first-tier" review of other potential actions, including the Proposed Project. This EA/IS focuses only on Proposed Project site-specific activities and serves as a joint NEPA/CEQA document for Project authorization by both federal and California state regulatory agencies.

1.7 Federal and California Lead Agencies

This document is tiered to and incorporates the information contained in the Trinity River Master EIR by reference in its entirety. As an integrated, multi-purpose document, the Trinity River Master EIR is responsive to the efforts of the lead, responsible, and cooperating agencies to ensure that it addresses applicable laws, policies, and regulations. At the same time, it incorporates the input provided during the scoping process in conjunction with the extensive level of consultation and coordination between the agencies.

Reclamation is responsible for the funding and implementation of the Proposed Project and is the federal lead agency under NEPA. The BLM, which manages land within the Proposed Project site boundaries, serves as a co-lead for the Project. The Regional Water Board is the California state lead agency under CEQA. The Trinity County Resource Conservation District (TCRCD), in its role as an experienced implementer of restoration actions, collaborator on TRRP revegetation, and past CEQA lead for the Lewiston-Dark Gulch project, is working with the TRRP to ensure that CEQA guidelines are fulfilled.

Trinity River Master EIR Phase 2 sites, like the Douglas City and Lorenz Gulch sites, are now eligible for enrollment and CEQA coverage following completion of any subsequent project-specific environmental analysis required to supplement the programmatic level review contained in the Trinity River Master EIR as necessary. Under California Code of Regulations, Title 14, Section 15177, after a Master EIR has been prepared and certified, subsequent projects, which the lead

agency determines as being within the scope of the Master EIR, will be subject to only limited environmental review.

The preparation of a new environmental document and new written findings will not be required if, based on a review of the IS prepared for the subsequent project, the lead agency determines, on the basis of written findings, that no additional significant environmental effect will result from the proposal, no new additional mitigation measures or alternatives may be required, and that the project is within the scope of the Master EIR. Whether a subsequent project is within the scope of the Master EIR is a question of fact to be determined by the lead agency based upon a review of the IS to determine whether there are additional significant effects or new additional mitigation measures or alternatives required for the subsequent project that are not already discussed in the Master EIR. This Douglas City and Lorenz Gulch EA/IS contains a site-specific Project description and other information required to apply for enrollment under General Permit R1-2010-0028 for Trinity River channel rehabilitation activities that the Regional Water Board will consider in making its determination and approval decision.

1.8 Regulatory Framework

In addition to CEQA and NEPA, the Proposed Project is subject to a variety of federal, state, and local statutes, regulations, policies, and other authorities. The decision to facilitate mechanical channel rehabilitation projects requires various permits from state agencies. The primary responsible and trustee agencies are U.S. Army Corps of Engineers (USACE), USFWS, NMFS, California DWR, CDFW, the Regional Water Board, California Department of Transportation (Caltrans), and Trinity County. Chapter 3 of the Trinity River Master EIR, Regulatory Framework, includes descriptions of the actions required of these agencies and of permits required for the TRRP work on the Trinity River as well as an overview of the principal environmental statutes that establish the regulatory setting that would be used to assess the impacts of rehabilitation activities. As necessary, the lead, cooperating, and responsible agencies will use the Trinity River Master EIR document for their permitting and approval process. Implementation of the Proposed Project, as described in Chapter 2, would generally require compliance with the federal, state, and local permit and approval processes and regulations described in Chapter 3 of the Trinity River Master EIR. For example, federal protection of the Trinity River, which is part of the Wild and Scenic Rivers System, is required under Section 7 of the federal Wild and Scenic Rivers Act (WSRA). The Trinity River is designated specifically for its outstandingly remarkable anadromous fishery value. The federal WSRA requires the preservation of its free-flowing condition; anadromous and resident fisheries; and outstanding geologic, wildlife, flora and fauna, historic and cultural, visual, recreational, and water quality values.

1.9 Scoping and Public Involvement

Since the signing of the ROD and efforts to begin its implementation, numerous public meetings and open houses have been held by TRRP and various lead agencies to gain public input and information for each channel rehabilitation site as well as programmatically under the Trinity River Master EIR. The Trinity River Master EIR includes a complete description of scoping and public involvement activities that occurred as part of that process (Trinity River Master EIR, section 1.6). The same agencies and organizations that were consulted during the preparation of the Trinity River Master EIR document are again in consultation for the Proposed Project.

The Trinity River Master EIR was developed specifically to identify and mitigate potential significant impacts as defined by CEQA. Accordingly, the same issues that were addressed programmatically in the Trinity River Master EIR are considered germane to the Proposed Project. These issues were used to develop the descriptions of the resource areas and the associated impact analysis presented in Chapter 3 of this document.

Designs for the Proposed Project have been under development by the joint design team since 2010. Preliminary designs were discussed with the public during an open house on October 12, 2010 at the Douglas City School in Douglas City, California. Designs were then discussed at two public meetings both of which were held at the North Fork Grange Hall in Junction City, California – one on February 11, 2011 and one on July 27, 2011. At that time, the designs for both sites were made ready for public review and NEPA/CEQA analyses. However, to incorporate stakeholder feedback and adaptive management input made by the TRRP's SAB during the Phase I review, the 2011 project concepts were redesigned. Public meetings to discuss updated designs for the Douglas City and Lorenz Gulch Rehabilitation Sites were held at the Trinity Alps Golf Course on November 14, 2012 and at the Douglas City School on December 11, 2012. These meetings kept landowners and residents current with the planning process for 2013 channel restoration Projects and specifically sought their input.

As part of the public involvement process for the Douglas City and Lorenz Gulch sites, Reclamation used a stream restoration decision analysis and design guidance tool (Stream Project Tool) that was created to define and implement a rational, objectives-driven approach to evaluating and designing stream restoration projects. Using the Stream Project Tool, stakeholders were given the opportunity to participate in the scoring of proposed alternative designs for these two sites. The design team developed design objectives to more clearly identify desired features or processes within the rehabilitation project alternatives for use with the Stream Project Tool. Each objective carried a specific metric or method for measuring the proposed objective within the design. For example, fry rearing habitat was assigned a performance measure range based on the change in habitat area per use-day. Therefore, participants were able to contribute their opinions of design alternatives in a quantifiable manner using a ranking system to assign preference for some design objectives versus others. The alternatives that contained more objectives that were viewed as favorable to the stakeholders scored higher, and those alternatives measured greater in the dominance analysis that followed the ranking process. The design team also used the Stream Project Tool to evaluate the proposed alternatives. Although differences exist in terms of technical knowledge, the method delivered a preferred alternative based on the ranking of measurable objectives for each group. The results helped the design team characterize stakeholder concerns by their positions within well-defined categories, and showed what design objectives caused a particular design alternative to rank higher. This allowed feature inclusion/placement to be modified earlier than had been possible on past rehabilitation site designs.

In addition to the meetings listed above, TRRP staff has worked closely with the local TRGA to understand their concerns and to adjust the Proposed Project to alleviate these concerns where possible. TRRP staff have attended Trinity River fishing guide meetings and floated the river with individual guides in order to gain their project insights. TRRP staff members will continue to meet with local groups (e.g., fishing guides and mining groups) and landowners from the Douglas City

area, where the sites are located, in order to obtain stakeholder input and advice as well as to address concerns.

Notice of all public meetings, and other pertinent Project information, is announced in the local Trinity Journal newspaper and posted on the TRRP's website: http://www.trrp.net/. The TCRCD assisted the TRRP with public notification and meetings so interested parties could learn about the Project and provide their input. The official public review period for this EA/IS began when the document was submitted to the California State Clearinghouse on March 8, 2013. The document was circulated to local, state, and federal agencies and to interested organizations and individuals for review and comment on the analysis. The public scoping period ran from March 8 to April 12, 2013. Concurrent with this review period, public notice was provided to solicit additional comments from the public and interested parties. Public notice included: posting on the TRRP website; advertisement(s) in the local Trinity Journal newspaper; letters mailed to local landowners; email notices to interest groups; and signage posted at the Project sites informing the public of the availability of the EA/IS for review. An open house was also held on March 20, 2013 at the Douglas City School to describe the Proposed Project and receive public input.

Three comments were received during the public comment period for the EA/IS. One letter was received from the TRGA, one from the CDFW, and one from a private individual with a mining claim located within the Douglas City site boundary. The federal and state lead agencies have now responded to the comments received. A summary of these comment letters and the responses from the TRRP are included in Appendix B. In addition to updating this section based on public involvement activities that have occurred since the Draft EA/IS was released for public comment, adding the public comments and responses in Appendix B, and correcting minor errors, minor edits were made to the Draft EA/IS (section 3.12) to: 1) clarify BLM's use of the Visual Resource Management system for evaluating scenic values along the restoration reach and within the designated Wild and Scenic River corridor, and 2) tie the programmatic Wild and Scenic River Section 7 Analysis and Determination from the Master EIR to the specific project areas at Douglas City and Lorenz Gulch.

Copies of this EA/IS are available for review on the TRRP website and on Reclamation's website: http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=12570, as well as at the following locations:

Trinity River Restoration Program
United States Department of the Interior
Bureau of Reclamation
1313 South Main Street
Weaverville, California 96093

United States Department of Interior
Bureau of Land Management
Redding Field Office
355 Hemsted Drive
Redding, CA 96002

Trinity County Resource Conservation District
#1 Horseshoe Square
Weaverville, California 96093

Trinity County Library, Weaverville Branch
211 Main Street
Weaverville, California 96093

Copies of the Trinity River Master EIR, the December 19, 2000, ROD and Trinity River FEIS/EIR are available for public review on the TRRP website: http://www.trrp.net or at:

Trinity River Restoration Program Office
U.S. Department of the Interior – Bureau of Reclamation
1313 South Main Street
Weaverville, California 96093
(530) 623-1800

Chapter 2

2 PROJECT DESCRIPTION AND ALTERNATIVE DEVELOPMENT

This chapter describes the Project's objectives and discusses the process used to develop the Proposed Project as analyzed in this document. It also describes the design criteria, design concepts, and site locations associated with the Douglas City and Lorenz Gulch sites. Two alternatives are considered in this document: the No-Project alternative and the Proposed Project alternative. Alternatives considered but not selected for evaluation are also discussed. The term Proposed Project is used rather than Proposed Action, however, for the purposes of this document, the terms are synonymous.

2.1 Background

To meet the Project objectives the TRRP has identified 15 discrete activities (see Chapter 2 of the Trinity River Master EIR), most of which have been incorporated into the Proposed Project as described later in this chapter. In addition to these activities, several earthwork and habitat construction activities, which were identified in the Master EIR, have grown in scope in recent projects. The addition of wood (i.e., LWD) is elaborated on in this document as an important rehabilitation tool and construction of split flow channels is now added. In the Master EIR, LWD placement was included within sediment management activities and activities common at each site. However, in the Wheel Gulch EA/IS (Regional Water Board, Reclamation, and BLM 2011) LWD installation, including construction of both large wood habitat structures (which are designed during construction in the field), and larger Engineered Log Jams (ELJs – which are designed in the office), was identified as a stand-alone construction activity. The increasing use of wood to create aquatic habitat and hydraulic complexity (scour) at channel rehabilitation sites, and recommendations for additional wood use at future sites (Cardno Entrix and CH2MHill 2011), require that this important rehabilitation activity be highlighted as a common activity planned in the Proposed Project and other Phase 2 sites. Similarly, construction of a split flow channel, which divides Trinity River flow into two branches of similar volume, is proposed and identified as an individual activity in Table 1; a similar split flow channel was constructed at the Lowden Ranch project in 2010 and Wheel Gulch in 2011. The impacts associated with implementation of these activities do not rise above those identified and analyzed in the Master EIR, but their increasing use and visibility requires that these activities be clearly identified for the reader.

2.2 Goals and Objectives

The TRRP has developed a number of restoration objectives for the channel rehabilitation sites that help frame the alternative development process. These objectives are intended to be used to identify specific activities that could be implemented at Trinity River locations. Ultimately, the goal of the activities described in the Trinity River Master EIR is to increase the quantity and quality of suitable rearing habitat for native anadromous salmonids and other native fish species, while reestablishing geomorphic processes required to enhance alluvial features, such as alternate point bars and meander sequences, in the Trinity River. These objectives were used by the design team to

identify specific activities that could be applied within the Proposed Project. This document focuses on these activities that are intended to restore fluvial processes through the rescaling of the river channel and floodplain for the purpose of creating, restoring, and enhancing habitats for all life stages of native anadromous fishes, including salmon and steelhead. Designs at Douglas City and Lorenz Gulch have considered effects to salmonid adult holding habitat. In areas near log jams, scouring and deepening are expected (unless they are completely underlain by bedrock), which should result in development of additional holding habitat.

With input from stakeholders, the lead agencies considered a number of objectives in the alternative development process (see Trinity River Master EIR, Section 2.2 for these objectives). For the Proposed Project, the specific in-channel (within the active low water channel) and riverine (within the ordinary high water mark [OHWM], but not contiguous with the active channel) activities proposed are intended to assist in reestablishing fluvial processes and interactions. Conceptually, the objective is to increase connectivity between the Project sites, the Trinity River, and their shared floodplain. The proposed rehabilitation activities could result in the development of a larger and more complex expanse of river and floodplain habitat. Based on successful TRRP rehabilitation projects constructed over the past seven years, it is anticipated that fluvial processes will affect a larger area than the defined limits of activity within the Proposed Project site boundaries. This habitat expansion is expected to increase habitat suitability and availability for salmonids and other native fish and wildlife species at various river flows.

2.3 Alternative Development

The President's Council on Environmental Quality (CEQ) guidelines (Section 1502.14) and CEQA guidelines (Section 15126.6(a)) state that an EIS or EIR shall describe a range of reasonable alternatives to the Proposed Project that would feasibly attain most of the basic objectives of each project, but would avoid or substantially lessen significant effects in comparison to the Proposed Project (Section 2.5 later in this chapter provides brief descriptions of alternatives considered but eliminated from further evaluation). Section 15126.6(c) of the CEQA guidelines states that among the factors which may be taken into account when addressing the feasibility of alternatives is site availability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site.

The alternative development process for the TRRP considered input from stakeholders, particularly local residents and resource agency personnel; existing engineering data; and social, physical, and biological factors. Consistent with the AEAM Program, the Proposed Project designs reflect the collective experience of the TRRP and the TMC from the implementation of previous mechanical channel rehabilitation projects (e.g., Indian Creek, Sawmill, and Wheel Gulch among others). Information derived from the implementation of these projects, coupled with information on the biological and physical responses to these projects, was considered in the alternative development process.

The following criteria were applied to evaluate the ability of the Proposed Project to meet the objectives outlined in Section 2.2 of this document. Pursuant to NEPA, the purpose and need (presented in Chapter 1) were also considered in this evaluation.

- Effectiveness – The methods, materials, and performance of previous Trinity River restoration projects (including the original pilot projects constructed in the 1990s and the recent TRRP channel rehabilitation projects) in similar environments.
- Implementation – Practical execution, including potential public acceptance issues, permitting issues, and land use issues, was considered. Constructability and the complexity of maintaining the rehabilitation sites over time were also considered.
- Environmental – Benefits and impacts to environmental resources with emphasis on special status species, including native anadromous salmonids, and humans were considered. The impacts considered included both short-term construction-related impacts and long-term maintenance impacts associated with post-ROD flows. Aquatic habitat, jurisdictional wetlands, accessibility, and consistency with land use planning were considered in the type and location of proposed activities.
- Cost – The relative cost of each alternative, including construction and revegetation costs, was considered. Cost was used to identify alternatives that were significantly out of proportion with other alternatives.

A number of alternatives were initially evaluated in the Trinity River Master EIR using the criteria outlined above; as a result three alternatives were included in that analysis –No-Proposed Projects alternative, Proposed Projects alternative, and Alternative 1. The Proposed Projects alternative was determined to most efficiently meet Project objectives and was selected as the preferred alternative in the Trinity River Master EIR. Alternative 1 was analyzed in the Trinity River Master EIR in response to input provided by stakeholders, including landowners along the river corridor, and represented a reduction in the size, intensity, and magnitude of rehabilitation activities, particularly those in close proximity to residential or recreational developments. Alternative 1 was expected to reduce significant impacts to various resources, especially to the human environment (e.g., traffic, noise near residential areas, etc.); however, it was not expected to expand Trinity River aquatic habitat complexity and quantity or to enhance natural river processes to the same extent as the Proposed Projects alternative. Consequently, benefits to fish and wildlife populations would be reduced compared to the Proposed Projects alternative. As a result Alternative 1 was not selected as the preferred alternative in the Trinity River Master EIR and is not carried forward for analysis in this EA/IS.

2.4 Description of Alternatives

A description of the two alternatives that are carried forward in this analysis is presented in this section. Both the Proposed Project and No-Project alternatives are described. The No-Project alternative is presented first to provide comparison of impacts to the Proposed Project.

2.4.1 No-Project Alternative

The No-Project alternative represents ongoing activities and operations of the TRRP and other entities involved in restoring the Trinity River with the exception of the Proposed Project. Consistent with CEQA Guidelines, Section 15126.6, subdivision (e)(2), existing conditions are defined as those that "would be reasonably expected to occur in the foreseeable future if the project were not approved" (Association of Environmental Professionals 2009). This is consistent with the NEPA definition of the No Action alternative involving federal decisions (42 USC 4321–4347).

Collectively, actions and activities authorized in the ROD and incorporated into the No-Project alternative include:

- Implementation of the annual flow release schedule based on recommendations of the TMC to Reclamation; and
- Implementation of watershed restoration and rehabilitation projects within the Trinity River Basin, including those funded by the TRRP and members of the TMC, BLM, and TCRCD.

2.4.2 Proposed Project

The Proposed Project includes specific activities within the Douglas City and Lorenz Gulch site boundaries. The activities proposed are similar to those implemented at previous channel rehabilitation sites and include: reducing riparian encroachment; LWD placement; physical alteration of alluvial features (e.g., floodplains and side channels); construction of large wood hydraulic and habitat structures; and removal/replacement of riparian and upland vegetation at strategic locations. Extensive revegetation of native riparian vegetation (woody and wetland species) and management of upland mixed conifer habitats, to mimic historic conditions, is also planned. The specific activities that would occur within the Proposed Project site boundaries are described below and shown on Figure 4 for Douglas City and Figure 5 for Lorenz Gulch. The information contained in this section describes the timing, type, size, intensity, and location of the activities associated with the sites consistent with the CEQA Guidelines (Section 15176 (a) and (c)).

2.4.2.1 Mechanical Channel Rehabilitation Activities

The TRRP has developed Project-specific objectives for the sites as well as specific activities that would occur at defined locations in support of these. The Douglas City site expands upon goals and objectives outlined in the TRFEFR and the Channel Design Guide (HVT et al. 2011). The designs for the Douglas City Rehabilitation Site address the Project goal of building and sustaining dynamic bar (point, medial) and riffle morphology that should achieve the following biological goal: to increase and sustain the availability, quantity, and quality of anadromous fish habitat between 300 cfs and 2,000 cfs for all life stages. Construction activity areas within the Douglas City Rehabilitation Site were designed for the river to function and evolve in a way that will meet Project goals. The following Project objectives, which include variations on the "Stream Project" objectives mentioned in Chapter 1, were developed for the Douglas City site:

- Increase fry rearing within the Project area, area of tributary and off-channel rearing habitat, and adult spawning and holding habitat;
- Maintain adult holding and spawning habitat and juvenile rearing and refugia habitat;
- Increase habitat area suitable for western pond turtle and yellow-legged frog;
- Promote development of diverse riparian and upland communities and development of patchy vegetation;
- Preserve riparian corridor and large trees where possible;
- Increase area for natural riparian regeneration;
- Avoid impacting previously revegetated areas;
- Increase residence time of fine sediment within Project floodplain;
- Reduce invasive plants;
- Increase channel complexity, bed topography, and floodplain complexity;
- Increase coarse sediment storage and residence time;

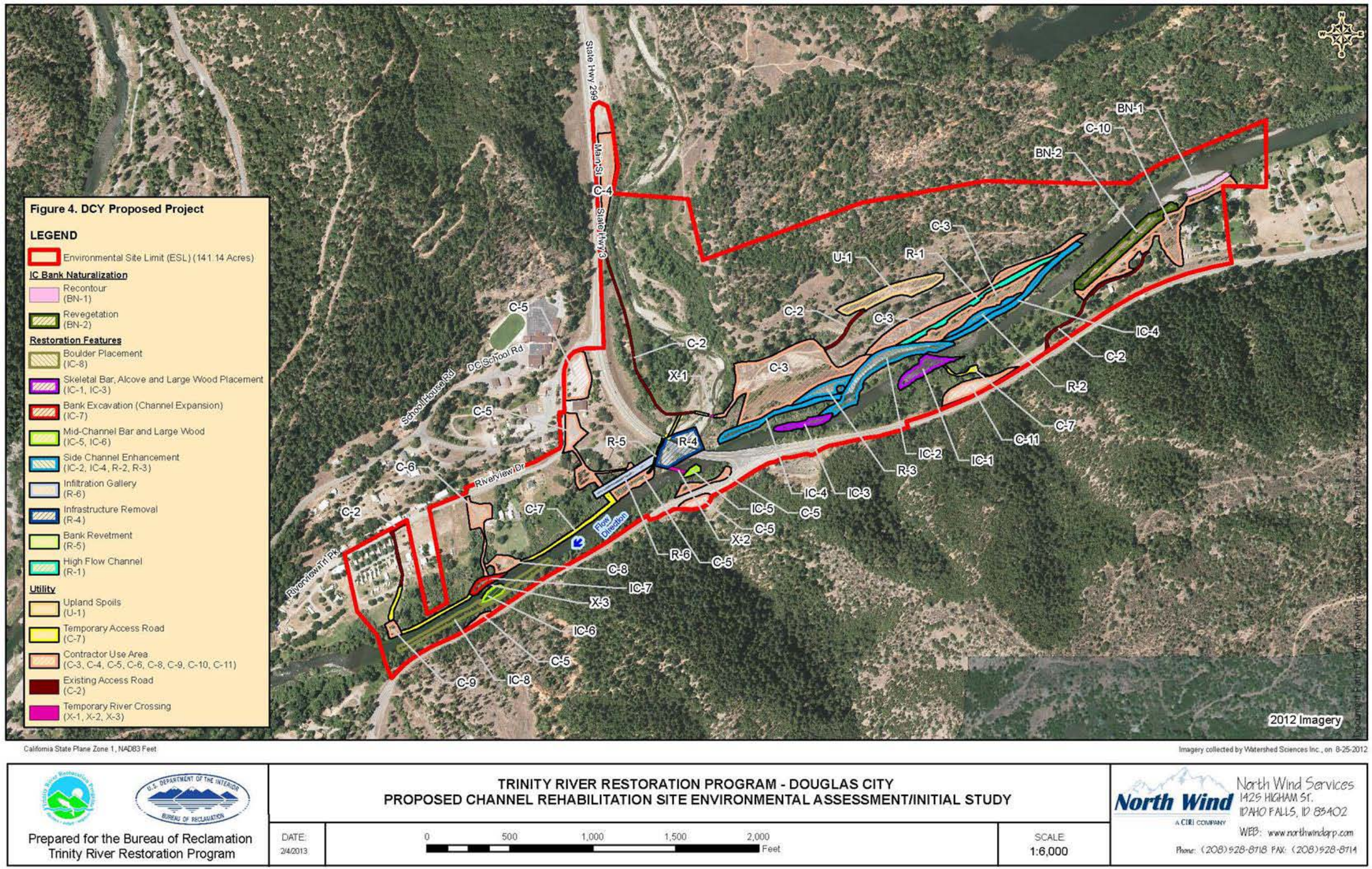

Figure 4. Douglas City Rehabilitation Site – Proposed Project

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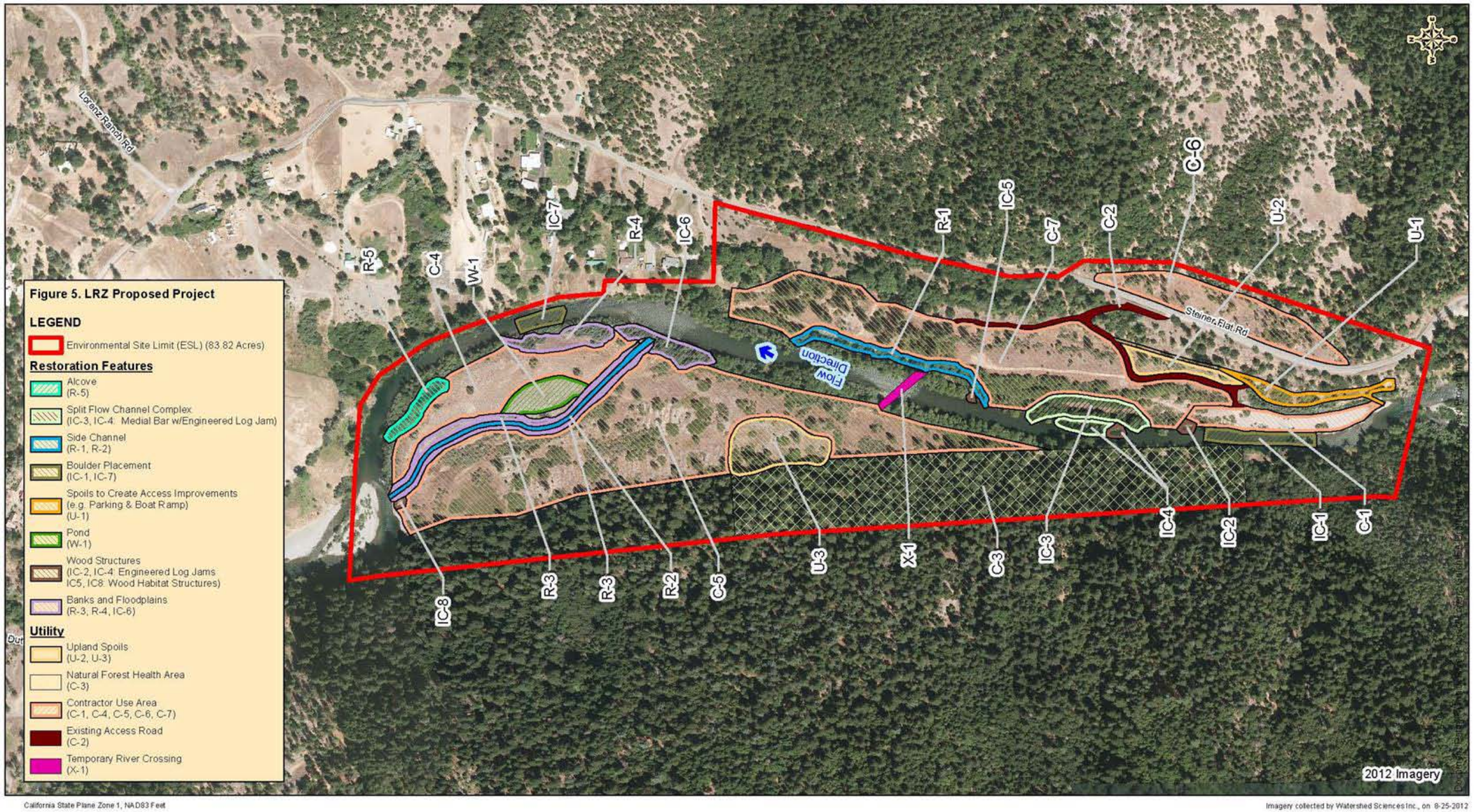

Figure 5. Lorenz Gulch Rehabilitation Site – Proposed Project

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- Increase sinuosity;
- Increase large wood supply, storage, and routing;
- Reduce bank armoring;
- Reduce coarse sediment size – scaled to new flow regime; and
- Enhance/maintain dynamic alluvial properties within the delta.

In addition to the above general objectives for the Douglas City site, the primary design objectives for the bank naturalization work are to improve riparian habitat conditions along the Trinity River and to develop a demonstration site for landowners who may be interested in riparian vegetation recovery on their own lands in lieu of maintaining traditional manicured lawns like those that currently exist on site. The contoured and developed gravel and revegetated Project areas are expected to:

- Provide increased low velocity fish habitat at flows greater than approximately 2,000 cfs;
- Provide terrestrial input to the river (e.g., invertebrates and woody material); and
- Increase vegetation available for riparian obligate species (e.g., migratory birds).

The rehabilitation goals for the Lorenz Gulch Rehabilitation Site are linked with the overall river restoration strategy of the TRRP and detailed in the TRFEFR. The overall goals of the proposed design are to increase the availability, quantity, and quality of anadromous fish habitat at and above 300 cfs baseflow for all life stages; increase available floodplain and favorable riparian vegetation; and increase the quality and quantity of coarse sediment within this segment of river to provide increased available spawning habitat and geomorphic complexity. Achievement of these goals would be through implementation of the following design objectives:

- Create valuable off-channel habitat for fry and juvenile rearing at all flows through construction of two low flow side channels, an off channel pond and an alcove;
- Increase the quality of fry and juvenile rearing habitats at all flows, and encourage the scour of pools and banks through the addition of LWD;
- Create off-channel habitat over a range of flows by reconnecting a previously constructed side channel at flows of around 1,500 cfs;
- Facilitate natural river processes via berm excavation to establish low angle streambanks, floodplain connectivity, and coarse gravel recruitment;
- Increase available spawning habitat and number of salmon and steelhead spawners per year within the design site;
- Preserve existing riparian vegetation wherever desirable and promote natural riparian vegetation recruitment through creating favorable physical conditions; and
- Revegetate constructed side channels with clump plantings and native woody and herbaceous riparian plant species to provide immediate shade and cover and increase aquatic habitat diversity from summer/fall baseflows up to managed spring flood releases (HVT et al. 2011).

Table 1 contains general descriptions of the types of activities included within the Proposed Project. Refer to Section 2.3.2 of the Trinity River Master EIR for more information about each of these activity types. Several additional activity types have been added since the Master EIR was completed to clarify the intent of the activity for the reader.

Table 1. Rehabilitation Activities at the Proposed Project Sites[4]

LABEL	ACTIVITY TYPE
A	Recontouring and vegetation removal (banks and floodplains)
B	Construction of inundated surfaces (450 cfs)
C	Construction of inundated surfaces (1,000 – 4,500 cfs)
D	Construction of inundated surfaces (6,000 cfs)
E	Low-flow side channel (300 cfs)
F	High-flow side channel and gravel infiltration areas
G	Alcove
J	Placement of excavated materials
K	Staging/contractor use areas (includes gravel/rock processing and stockpiling)
L	Roads, existing
M	Roads, new
N	Temporary channel crossings (Trinity River and tributary)
O	Revegetation
P	In-river installation: construction of engineered log jams/hydraulic structures (wood and/or rock), habitat wood structures, skeletal bar or boulder habitat placement
Q	Split flow channel (30 to 60% of river flow)
W	Wetland complex – rearing pond

Activities A through G are intended to increase the potential for the river to meander (migrate) within the floodplain in which it has been confined by historic dredging activities and, more recently impacts related to the construction and operation of the TRD. In addition to the immediate changes to the channel (e.g., side channel construction and berm removal), the Proposed Project would increase the likelihood that the Trinity River would reflect more of the "healthy river" attributes of an alluvial river, as described in Section 4.3 of the Trinity River Master EIR. Activities E, F, G, P, and Q are intended to create aquatic habitat that would provide refuge for salmonids and other aquatic wildlife during inundation and that would evolve over time. The side channels, alcoves, and floodplain enhancements would also provide additional complexity to the riverine environment and areas of riparian habitat diversity. All of these activities are consistent with the "healthy river" attributes. Activities J through M are associated with the transfer, placement, and stabilization of material excavated from the riverine areas. Activity N crossings provide a reasonable method to access activity areas on the opposite side of the river or Weaver Creek at the Douglas City site. In conjunction with Activity J, various grading techniques would be used to develop seasonal, off-channel riparian habitat available for western pond turtle and other riparian-dependent species. Activity K includes the processing and storage of coarse sediment or boulder material for use in construction of in-river installations (Activity P). Activity P uses wood and rock

[4] Several activity labels are omitted (e.g., H for grade control removal) as these activity types were enumerated in the Master EIR but not utilized at the Proposed Project sites.

structures to increase fluvial and channel complexity, which will in turn build and maintain aquatic habitats. Activity P is intended to increase woody material which is a natural part of healthy rivers and provides important habitat for aquatic species, including cover from high flows and predators, collection of suitable spawning materials, and a food source for aquatic insects. It can also create and maintain beneficial habitat features such as pools, side channels, islands, and gravel bars. Activity O includes revegetation of disturbed surfaces. Activity Q would create a split flow channel off the mainstem Trinity River that would flow at all times including during low flow conditions. Activity W would create pond habitat for western pond turtle and yellow-legged frog and provide greater diversity of fish habitat.

Activity A (Recontouring and Vegetation Removal)

The ground surface would be modified to reduce riparian encroachment and minimize the risk of stranding of juvenile salmonids. Vegetation would be cleared at some locations, but would be maintained where possible. Activity A, sometimes referred to as the grading of banks and floodplains, or simply as "banks and floodplains," includes grading to construct or enhance topographic features that could develop into functional riparian habitat; excavation and fill would be balanced such that there is no net change in the volume of earthen material within the activity area. Vegetation removal would enhance historic patchy forest wildlife habitat. Removed vegetation would be used for in-river placement as LWD, chipped/masticated, or spread/buried in revegetation areas in order to increase nutrients and water holding capability of the soils. Activities would be accomplished using a variety of methods, including hand tools and heavy equipment, such as excavators, bulldozers, scrapers, and dump trucks.

Activities B, C, and D (Construction of Inundated Surfaces)

Activities associated with the construction of inundated surfaces would enhance the connection of these surfaces to the river at various flows. As a reference point, the OHWM correlates to a 1.5-year recurrence flow. (On figures the OHWM is estimated by hydraulic modeling). These activities are intended to expand the surface area of the channel that could be inundated by reoccurring flows below the OHWM. Vegetation would be cleared as necessary, and earth would be excavated to meet design elevations for periodic inundation.

Newly inundated surfaces would provide important rearing and slow-water habitat for juvenile salmonids and other native anadromous fish. They would also provide low points that could enhance sinuosity and thereby provide the habitat variability that was historically present and is required to support rapid growth of native fishes.

These treatment areas would rely on a combination of natural recruitment of native riparian vegetation and riparian planting to enhance the establishment of a diverse assemblage of native vegetation. If initial revegetation establishment is less successful than anticipated, additional efforts would be made to establish riparian vegetation consistent with the CDFW policy of no net loss in riparian vegetation from pre-project levels.

Activity E and F (Side Channels)

Modifications to create or change side channels would reconnect the Trinity River with its floodplain at targeted flows. Side channels constructed for 300 cfs flows would provide off-channel, low-velocity habitat for a variety of aquatic organisms, including juvenile salmonids at base flow conditions. Side channels constructed for 1,000 cfs flows would provide habitat for

salmonid rearing when water is flowing through the channels. As flows recede during the year, these side channels would drain naturally, reducing the likelihood of stranding aquatic organisms. It is important to note that side channels do not necessarily flow year round. Side channels would evolve over time and partially vegetate. While the duration of side channel flow would be dependent upon their evolution over time and the river's water surface elevation (WSE), even when water is not flowing, riparian and wildlife habitat diversity would be increased.

Side channels would be constructed to leave earthen berms near the upstream and downstream ends to protect water quality during construction. These berms would be removed at the end of construction if the water in the side channel is of appropriate quality for discharge to the river or the water in the side channel would be left in place for removal by subsequent high flows. Side channels may be pumped to uplands and dewatered during construction, or slowly metered into the mainstem post-construction. These techniques reduce the amount of turbid water that ultimately reaches the Trinity River during side channel connection.

Activity G (Alcoves)

Alcoves would be excavated to design elevations at the downstream end of side channels or other appropriate locations. They would be continuously inundated (approximately 1-2 feet deep during low flows), scoured/maintained during high flows, and would provide year-round juvenile fish habitat.

Activity J (Placement of Excavated Materials)

Excavated materials would be placed in spoil areas so that there would be no increase in the elevation of the 100-year flood to comply with the requirements of Trinity County's Floodplain Ordinance. Spoiled materials would be spread in uniform layers that blend with the natural terrain. In general, revegetation of upland areas, including efforts required for erosion control, would be consistent with agency requirements and with authorization from land managers and owners. Refer to Activity O (Revegetation) for more information. Placement of excavated and cleaned coarse sediment or cobbles may alternatively be used to create an infiltration gallery to allow sub-surface water flow.

Activity K (Staging/Contractor Use Areas)

Excavated materials would be transported across the staging area to stockpile areas. Water would be applied for construction purposes, including dust abatement, as directed by the Contracting Officer. Activity in these areas would include maintaining existing water wells and other infrastructure. The staging area may also be used for processing and storage of coarse sediment required for long-term sediment management activities or to obtain and store boulders for use in constructing hydraulic structures and boulder habitat placements. Thinning may occur in forested areas, under BLM guidance, in order to enhance historic mature forest habitat conditions. Thinned forest material would be used in wood installations.

Activity L and M (Roads, Existing and New)

Access to the Proposed Project sites would primarily be via SR-299 and Steiner Flat Road. The contractor may also choose to deliver large wood and boulders to in-channel work areas downstream of the 299 Bridge (e.g., IC-5 and IC-6) by using a crane staged in various pullouts on SR-3. On-site roads would be used for one or more activities (e.g., access for equipment and personnel, removal of material, revegetation efforts, and monitoring activities). The location of the activity areas within the sites would require construction of new access roads for specific Project

purposes. Site-specific design would consider factors like topography, soils, existing vegetation, and the need for future vehicle access. Best management practices (BMPs) would be used to reduce the impacts of road-related sediment on the riparian and aquatic environments.

Activity N (Temporary Channel Crossings)

Temporary crossings would provide access across the river and over Weaver Creek in the Douglas City Project area. These temporary crossings occur in "X" activity areas on the figures, and may include constructed fords, temporary bridges, or other site improvements to facilitate access for construction-related traffic. If required, temporary bridges would be used when crossings are needed outside of the summer (July 15-September 15) in-channel work window. All temporary crossings would be designed and constructed to meet the requirements for heavy equipment such as trucks, excavators, and scrapers. Fords would be constructed using native alluvial materials excavated from the bed and bank of the Trinity River or adjacent sources. With the exception of rip-rap or other stabilizing materials, material would be primarily extracted from activity areas within identified TRRP sites. Use of fords to cross the river would be minimized.

Due to requirements to retain passage for fish and boats, at least 1/3 of a ford crossing would be submerged to a minimum depth of 1 foot under low-flow conditions. The construction of the temporary crossings would likely require some vegetation removal at entrances and exits to the channel. If temporary bridges or other constructed crossings are used, abutment material may be extracted from activity areas. All temporary crossings would be constructed in a manner that does not impede navigability at the specific site.

Activity O (Revegetation)

Impacts to vegetation are anticipated at most of the activity areas. Revegetation of riparian areas would rely on a combination of planting and natural recruitment of native species. Revegetation would occur to address landowner requests and fish and wildlife requirements. Native willows from the impact areas would be replanted as clumps during construction to speed recovery of vegetation. Replanting of impacted native vegetation (e.g., willows and cottonwoods) after construction is also planned. In general, the TRRP objective is to ensure that riparian vegetation is minimally impacted by TRRP activities and is replaced at a 1:1 ratio (no net loss of riparian area habitat) within the Trinity River corridor. Revegetation is designed to provide aquatic refugia at high flows, improve terrestrial habitat for birds and other wildlife, provide future wood recruitment, and to provide future terrestrial nutrient input to the river. Additional planting, seeding and mulching is also planned to control or inhibit the reestablishment of noxious and invasive plant species.

Activity P (In-River Installation of LWD [Hydraulic and Habitat Structures], Skeletal Bars, and Boulder Habitat)

The TRRP would use appropriate materials to cause and enhance geomorphic action that would also enhance aquatic and wildlife habitat. Addition of large rock (> 6 inch as in the ROD's skeletal bars) or rock/wood structures would remain in place and confine the river, thereby increasing stream power to scour and maintain adult salmonid holding habitat.

As appropriate, salvaged LWD would be retained and incorporated into riverine/in-channel activities to provide additional hydraulic and habitat complexity. This could include LWD placement as individual pieces, small accumulations, and large habitat structures. The addition of large wood would develop topographical and hydraulic complexity and increase bank length to

provide additional rearing habitat over a wide range of flows. Incorporation of woody material would improve anadromous fish spawning and rearing habitat.

Woody material is a natural part of healthy rivers. It provides important habitat for aquatic species by providing cover from high flows and predators. Its low velocity areas collect suitable spawning materials and its organic materials are a food source for aquatic insects. It can help create and maintain beneficial habitat features such as pools, islands, and gravel bars. Activity P may also include the construction of ELJs to further engage the flow and act as a catalyst for natural processes of scour and channel migration. Construction of larger habitat structures or ELJs may incorporate the use of rock and boulders as ballast to ensure that the structures do not migrate with high flows. Furthermore, these ELJs may specifically be built with downstream "skeletal bars," thus forming habitat complexes that would grow in depositional areas.

All LWD installations would be designed so that local velocities would be safe for navigation during relatively low river flows (less than approximately 2,000 cfs). Natural wood material would be placed in a manner to reduce the chances of hazardous contact with swimmers and boaters. Over time, woody material would collect on the structures to create areas of slower flow, which would direct water flow and, consequently, boaters away from the LWD. This would minimize the hazard of these structures to people.

The Proposed Project would place wood in alcoves to improve the quality of habitat in this design element by providing cover for juvenile fish, enhancing roughness and complexity, and increasing shading. Because of uncertainties in the availability, types, shapes, and sizes of the wood and the planned construction methods, the exact amounts and locations of wood placement are not known at this time. The final locations and dimensions of wood and large rock (skeletal bar) placement would be determined in the field based on direction from Reclamation's field engineer.

Boulder habitat placement would occur in both Project areas to create holding habitat for adult salmonids. Boulders of between 2 and 8 feet in diameter would be placed singly and in groups by either an excavator (in-river) or by a crane (from shore), to create holding areas – primarily for larger fish.

Activity Q (Construction of Split Flow Channels)

A new channel would be excavated to accept between 30 and 60 percent of the mainstem Trinity River flow during low flow conditions. The constructed split flow channel would be excavated through the existing floodplain, generally behind the existing riparian berm and vegetation. Similar construction methods to those noted for low flow side channels (Activity E) would be employed.

Activity W (Wetland Complexes – Rearing Ponds)

Ponds would be created off the mainstem Trinity River. The ponds would provide slow backwater refugia and year round rearing habitat for juvenile salmonid species. Groundwater infiltration and surface water in-flow from side channels would supply the ponds with a cold water environment. Existing tree/shrub canopy would be saved during construction to provide food sources, shade, and protection from predation. The ponds would contain deeper pools that have a connection to groundwater to supply needed cold water. Existing vegetative cover and re-vegetation planting would be incorporated into the ponds for food productivity.

2.4.2.2 Activity Areas

Tables 2 and 3 list the activity areas associated with the Proposed Project and Figures 4 and 5 illustrate these activities and construction areas. As the tables show, each activity area has been assigned a unique alphabetic label that corresponds to the type of activity area. For example, U-1 is the identifier for upland activity area 1. These labels are used throughout this document. For the Project, discrete activity areas were defined by the design team to include riverine areas, upland areas, and construction support areas. While these areas are intended to encompass the full range of activities, typically the actual area that would be treated will be smaller. For each site, riverine areas are labeled with an R preceding the site number (e.g., R-1, R-2); upland areas are labeled with a U (e.g., U-1, U-2); in-channel work areas are labeled with an IC; construction staging/contractor use areas are labeled with a C; wetland/pond areas are labeled with a W; and temporary crossings are labeled with an X. Roads are identified as existing or new. The tables also show the size of the activity areas, the estimated volume of material that would be excavated or filled, and the primary use anticipated for each area. Details are provided in Table 2 for the Douglas City site and Table 3 for the Lorenz Gulch site. Revegetation details for both sites are presented in Table 4.

Table 2. Activity Areas at the Douglas City Rehabilitation Site

Activity Area[a]	Primary Activity	Activity/ Treatment Area (acres)[b]	Earthwork (cubic yards)[c]	Fill (cubic yards)[c]
IC-1	Left Bank Skeletal Bar, Alcove & Large Wood Placement (P, G, O)	0.643	0	3,800
IC-2	Side Channel Enhancement: Bank Lowering & Shaping IC-1 with IC-2 creates a forced meander (B, O, P)	1.638	10,500	750
IC-3	Right Bank Skeletal Bar, Alcove & Large Wood Placement (P, G, O)	0.378	0	950
IC-4	Side Channel Enhancement: Large Wood Placement (C, E, O, P)	1.544	0	0
IC-5	Mid-Channel Bar & Large Wood Placement (B, C, P, O)	0.106	0	0
IC-6	Mid-Channel Bar & Large Wood Placement (B, C, P, O)	0.262		1,850
IC-7	Bank Excavation (Channel Expansion) (A, B, P)	0.264	3,000	0
IC-8	Boulder Habitat Placement (P)	0.692	0	100
	IC Subtotal =	***5.527***	***13,500***	***7,450***
R-1	High Flow Channel (A, C, O, P)	0.697	2,800	0
R-2	Side Channel Enhancement: Bank Lowering and Shaping (A, B, C, P)	0.395	1,300	0
R-3	Side Channel Enhancement: Bank Lowering and Shaping (A, B, C, P)	0.492	2,000	0
R-4	Remnant Infrastructure Debris Removal and Disposal (A, O)	1.010	0	0
R-5	Bank Revetment Infrastructure Protection (A, O, P)	0.054	0	0
R-6	Infiltration Gallery Footprint (A, O)	0.487	0	0
	R Subtotal =	***3.135***	***6,100***	***0***
BN-1	Bank Naturalization – Recontouring (A, C, O)	0.181	950	550
BN-2	Bank Naturalization - Riparian Planting (O)	1.265	0	0
	BN Subtotal =	***1.446***	***950***	***550***

Table 2. Activity Areas at the Douglas City Rehabilitation Site				
Activity Area[a]	**Primary Activity**	**Activity/ Treatment Area (acres)[b]**	**Earthwork (cubic yards)[c]**	**Fill (cubic yards)[c]**
C-2	Existing Access Road (L)	1.232	0	
C-3	Contractor Use Area (K, O)	7.858	0	0
C-4	Contractor Use Area (K, O)	0.934	0	0
C-5	Contractor Use Area (K, O)	3.067	0	0
C-6	Contractor Use Area (K, O)	0.586	0	0
C-7	Temporary Access Road (M)	1.031	0	0
C-8	Contractor Use Area (K, O)	0.358	0	0
C-9	Contractor Use Area (K, O)	0.165	0	0
C-10	Contractor Use Area (K, O)	2.190	0	0
C-11	Contractor Use Area (K, O)	0.703	0	0
	C Subtotal =	***18.124***	***0***	***0***
U-1	Upland Spoils (J, O)	1.181	0	19,500
	U Subtotal =	***1.181***	***0***	***19,500***
X-1	Temporary Tributary Crossing (N)	0.011	0	0
X-2	Temporary River Crossing (N)	0.047	0	0
X-3	Temporary River Crossing (N)	0.004	0	0
	X Subtotal =	***0.062***	***0***	***0***

[a] IC = in-channel work area; R = riverine work area; U = upland activity area; BN = bank naturalization; C = construction staging/contractor use areas; X = crossing

[b] Area calculated from project GIS

[c] Provided by TRRP

Table 3. Activity Areas at the Lorenz Gulch Rehabilitation Site				
Activity Area[a]	**Type of Activity**	**Activity/ Treatment Area (acres)[b]**	**Earthwork (cubic yards)[c]**	**Fill (cubic yards)[c]**
IC-1	Boulder Habitat Placement (P)	0.523	0	40
IC-2	Wood Structure – Engineered Log Jam (P)	0.070	0	650
IC-3	Split Flow Channel Complex (A, B, O)	0.887	10,900	0
IC-4	Split Flow Channel Complex – Medial Bar with Engineered Log Jam (J, P, O)	0.342	0	3,300
IC-5	Wood Habitat Structure (P)	0.027	0	300
IC-6	Banks and Floodplains (Berm Removal) (A)	0.628	1,300	0
IC-7	Boulder Habitat Placement (P)	0.266	0	40
IC-8	Wood Habitat Structure (P)	0.047	0	200
	IC Subtotal =	***2.790***	***12,200***	***4,530***
R-1	Side Channel (Low Flow) and Wood (A, B, E, P)	0.814	5,500	0
R-2	Side Channel (Hyporheic) (A, B)	0.485	14,000	0
R-3	Banks and Floodplains (A, P, G, O)	1.274	0	0
R-4	Banks and Floodplains (A, C)	0.665	3,700	0
R-5	Banks and Floodplains (Alcove) (A, C, G)	0.429	3,000	0
	R Subtotal =	***2.932***	***26,200***	***0***

Table 3. Activity Areas at the Lorenz Gulch Rehabilitation Site				
Activity Area[a]	**Type of Activity**	**Activity/ Treatment Area (acres)[b]**	**Earthwork (cubic yards)[c]**	**Fill (cubic yards)[c]**
U-1	Access Improvements, Boulder Harvest, and Spoils Area (J, L, O)	0.821	0	0
U-2	Upland Spoils (J, O)	0.580	0	11,900
U-3	Upland Spoils (J, O)	1.451	0	0
	U Subtotal =	***2.852***	***0***	***11,900***
C-1	Contractor Use Area (K)	1.178	0	0
C-2	Existing Access Road (L)	0.722	0	0
C-3	Natural Forest Health Area (A, K)	11.042	0	0
C-4	Contractor Use Area (K)	3.073	0	0
C-5	Contractor Use Area (K)	12.902	0	0
C-6	Contractor Use Area (K)	2.520	0	0
C-7	Contractor Use Area (K)	8.229	0	0
	C Subtotal =	***28.917***	***0***	***0***
W-1	Pond (A, B, O, W)	0.728	13,700	0
	W Subtotal =	***0.728***	***13,700***	***0***
X-1	Temporary River Crossing (N)	0.139	0	0
	X Subtotal =	***0.139***	***0***	***0***

[a] IC = in-channel work area; R = riverine work area; U = upland activity area; BN = bank naturalization; C = construction staging/contractor use areas; X = crossing; W = pond habitat
[b] Area calculated from project GIS
[c] Provided by TRRP

Table 4. Revegetation Type, Area, and Species Proposed for the Douglas City and Lorenz Gulch Sites		
Planting Type	**Size (acres)**	**Species**
Douglas City		
Toe Zonal[a]	0.7	Torrent sedge (*Carex nudata*), common rush (*Juncus effuses*)
Slope Zonal[b]	0.6	Cottonwood (*Populus trichocarpa*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), shiny willow (*Salix lasiandra*), California rose (*Rosa californica*)
Riparian Cluster	1.3 (139 clusters)	Cottonwood (*Populus trichocarpa*), red willow (*Salix laevigata*), shiny willow (*Salix lasiandra*), arroyo willow (*Salix lasiolepis*), Oregon ash (*Fraxinus latifolia*)
Upland Cluster	1.7 (47 clusters)	Incense cedar (*Caleocedrus decurrens*), Douglas fir (*Pseudotsuga menziesii*), ponderosa pine (*Pinus ponderosa*), canyon live oak (*Quercus chrysolepis*), California rose (*Rosa californica*), service berry (*Amelanchier alnifolia*), blue elderberry (*Sambucus nigra* ssp*. caerulea*), redbud (*Cercis occidentalis*), California coffeberry (*Frangula californica*)
Lorenz Gulch		
Wetland Zonal	0.1	Mugwort (*Artmesia douglasiana*), torrent sedge (*Carex nudata*), common rush (*Juncus effusus*), gray rush (*Juncus patens*), fruited bulrush (*Scirpus microcarpus*), hard stemmed bulrush (*Schoenoplectus acutus*)
Toe Zonal[a]	0.5	Torrent sedge (*Carex nudata*), common rush (*Juncus effusus*)
Slope Zonal[b]	1.2	Cottonwood (*Populus trichocarpa*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), shiny willow (*Salix lasiandra*), California rose (*Rosa californica*)
Riparian Cluster	0.3 (28 clusters)	Cottonwood (*Populus trichocarpa*), red willow (*Salix laevigata*), shiny willow (*Salix lasiandra*), arroyo willow (*Salix lasiolepis*), Oregon ash (*Fraxinus latifolia*), white alder (*Alnus rhombifolia*), California grape (*Vitus californica*), mugwort (*Artmesia douglasiana*), American dogwood (*Cornus sericea* ssp. *occidentalis*)

[a]Toe zonal plantings would occur within 24 inches of the water surface along the excavated side channels.
[b]Slope zonal plantings would occur on side channel slopes.

ACTIVITY AREA DETAILS

Douglas City Rehabilitation Site

The following section provides information about the activities proposed at the Douglas City Rehabilitation Site. Details are provided in Table 2. The proposed work at this site is divided up into three areas – downstream of the Douglas City Bridge, upstream of the Douglas City Bridge, and the bank naturalization work area. These separations are used in this section to describe which activities are in which portion of the Project area. Actions at the Douglas City site that are downstream of the Douglas City Bridge and the bank naturalization work are proposed for construction in 2013, as funding is available, and actions that are upstream of the Douglas City Bridge would be completed beginning in 2014. Access roads and contractor use areas identified on Figure 4 and in Table 2 could be used at any time during Project implementation.

Downstream of the Douglas City Bridge:

R-4 – Remnant Infrastructure Debris Removal and Disposal

Area R-4 includes removal and disposal of abandoned and remnant infrastructure such as pipe, concrete and bridge piles associated with Weaverville Community Service District (CSD) water withdrawal infrastructure (that presently supplies water to Weaverville and Douglas City) and past Caltrans Highway construction materials (e.g., old bridge materials that may be found). The purpose of this activity area is to: enhance the visual aesthetics of the Weaver Creek delta; reduce bank and bed armoring; and enhance/maintain dynamic alluvial properties within the Weaver Creek delta.

R-5 – Bank Revetment Infrastructure Protection

Area R-5 activities involve design and construction of a 'fish friendly' bank revetment incorporating wood and large boulders between the Douglas City Bridge pier/abutment and the Weaverville CSD infiltration gallery. This activity area is located along the lower portion of Weaver Creek as it flows into the Trinity River. The structure extends upstream from the mouth of Weaver Creek along the right bank and consists of regularly spaced logs with rootwads facing perpendicular to flow that are stabilized through partial burial and driven piles that also support a matrix of smaller logs oriented perpendicular to flow. Willows would be interplanted and boulders placed on the toe of the revetment to reduce the number of large logs required and to provide stability. The purpose of this activity area is to: prevent erosion along the right bank of Weaver Creek; protect existing and proposed infrastructure; promote pool scour on lower Weaver Creek; provide hydraulic and escape cover for juvenile Chinook and coho salmon and steelhead; and create holding habitat along the right bank of Weaver Creek and near the confluence with the Trinity River for upstream migrating adults.

R-6 – Infiltration Gallery Footprint

Area R-6 provides an area where the Weaverville CSD would have the option to repair/replace their infiltration gallery/water source during the channel rehabilitation construction work. The purpose is to support the Weaverville CSD community by facilitating needed infrastructure repair.

IC-5 – Mid-Channel Bar and Large Wood Placement

Activity area IC-5 is a mid-channel bar along the left bank of the Trinity River, just downstream of the Douglas City Bridge. In this area, large wood pieces would be placed at the upstream end of

the existing bar, with rootwads facing upstream (parallel to flow). Smaller logs, skewed to the flow, would then be placed downstream of the larger pieces. The structure would intercept flow and mobile wood, encouraging local bed scour, and create a low velocity area on the downstream end of the bar to encourage sediment deposition and to create hydraulic refuge for salmonids. The logs would be stabilized by the rootwads, through partial burial of the downstream end of the logs, and by interplanting with willows. The axis of the structure would be angled toward the left bank to promote sediment deposition. The structures would be partially inundated at 450 cfs and overtopped at flows of approximately 2,000 cfs. The purpose of this activity area is to create a site for riparian regeneration by reducing flow velocities and encouraging deposition of sediment and nutrients downstream from the structure; promote left bank/medial bar deposition and growth; increase channel complexity and sinuosity; increase right bank and Weaver Creek delta scour; increase large wood storage and retention; and provide hydraulic and escape cover for juvenile Chinook and coho salmon and steelhead.

IC-6 – Mid Channel Bar and Large Wood Placement

Activity area IC-6 is a mid-channel bar on the downstream end of the Project area near the left bank. Large wood pieces would be placed at the upstream end of the bar, with rootwads facing upstream (parallel to flow), with smaller logs placed perpendicular to flow, either upstream of the rootwads (thereby intercepting flow and mobile wood, and creating scour) or downstream of the rootwads (creating a low velocity hydraulic shadow that encourages sediment deposition and can be used as cover by salmonids). The logs placed on the bar, and the bar itself, would direct flow towards the right bank and would promote scour there to maintain existing salmonid adult holding habitat. The structures would be partially inundated at 450 cfs and 4,000 cfs, and completely overtopped, along with the entire bar, at around 6,200 cfs. The IC-6 feature would be designed to create a stable hard point within the channel that would divert flows away from the left bank at lower flows and would create an alcove along the right bank during higher flows. The purpose of this activity area is to promote transverse bar development and right bank scour; increase channel complexity and sinuosity; and increase large wood storage and retention. The site would provide immediate habitat benefits for juvenile and adult salmonids.

IC-7 – Bank Excavation (Channel Expansion)

Area IC-7 activities include excavation of a new mainstem channel. The mainstem channel would be constructed through some small existing islands such that the low flow channel width would be < 75 feet at 450 cfs. Approximately 3,200 cubic yards (CY) of material would be excavated from the right bank to match or deepen the current channel thalweg depth, approximately 250 feet long and 20 feet wide at the apex. Large wood pieces, root balls facing upstream at the downstream end of excavation (1-2 feet diameter and greater than 15 feet long), would be placed at the activity area along the right bank of the constructed mainstem channel. A pool, 40 feet long by 6 feet wide and 6 feet deep, would be excavated at the apex of the expansion area. The purpose of IC-7 is to: promote transverse bar development, right bank scour, pool formation, and scour; increase mainstem channel complexity and sinuosity; increase yellow-legged frog habitat; increase adult holding habitat; and increase fry and juvenile rearing habitat that meets cover, depth, and velocity criteria for targeted flows (300 to 2,000 cfs).

IC-8 – Boulder Habitat Placement

Area IC-8 activities consist of placing large boulders (ranging from 4-8 feet in diameter) along the left bank between RM 93.6 and 93.8. Boulders would be placed in clusters of four to six using an excavator from in-river or a crane staged from SR-3. The boulders would enhance the existing run by creating local variations in flow direction and velocity. The purpose of this activity area is to: promote small pool development through local bed scour and deposition; improve existing adult holding along the left bank; and increase channel complexity.

X-1, X-2, X-3 – Temporary River Crossing

Temporary crossings would provide access across the river, or in the case of X-1, across Weaver Creek. The X-1 crossing would utilize a temporary bridge that would provide access to the U-1 spoils area. The X-2 and X-3 temporary crossings would be low water ford crossing or other site improvements to facilitate access for construction-related traffic. X-2 would provide access to the IC-5 activity area and X-3 would provide access to the IC-6 activity area. Both the IC-5 and IC-6 areas consist of mid-channel bars and large wood placement.

U-1 – Upland Spoils

Area U-1 provides an area to place up to 20,000 CY of material that would be excavated from the R and IC activity areas. At a minimum, the area would be seeded and mulched at the end of the 2013 construction season and planted with upland vegetation after the Project is completed in the future.

C-2, C-7 –Access Roads

Construction access roads are classified as existing or temporary. Access roads are classified based on the public or private landowners' goals and objectives for their property. C-2 designates existing access roads and C-7 designates temporary access roads. Within the Project site, existing access roads would predominantly be utilized. Because scrapers would likely be utilized for excavation of channels and floodplains, these continuous loop haul roads would be essential for safety and efficiency. Post-Project, access roads would be returned to pre-construction condition, decommissioned, or left as improved, according to landowner approval.

C-5, C-6, C-8, C-9 – Contractor Use Area

Contractor use areas would be used for construction access, staging, stockpiling, mobilization, gravel processing, and other necessary construction activities during implementation. These contractor use areas are designated primarily as support areas, though boulders may also be taken from these zones (activity K) for use in-river. Depending on landowner goals and objectives, each contractor use area may be improved back to pre-construction condition or decommissioned.

Bank Naturalization Area:

BN-1, BN-2 – Bank Naturalization

The bank naturalization area is approximately 4 acres in size and is located between RM 94.5 and RM 94.7, extending 1,150 feet along the left bank of the Trinity River, 0.4 miles upstream of the Douglas City Bridge and 1 mile downstream from the confluence of Indian Creek and the Trinity River. The bank naturalization work includes two activity areas. Area BN-1 is located within three private parcels at the upstream end of the site. The existing surface in area BN-1 would be re-contoured in a band 20-30 feet wide along the river's edge to lower the existing surface by between 1 and 5 feet, creating a more natural surface that slopes gradually toward the river before terminating at an inner bank 1 to 2 feet high. Re-grading would include removal of much of the

fine substrate that currently underlies the lawns and replacing it with river bed material consisting of poorly sorted coarse sand, gravel, and small cobbles. An estimated 950 CY of very fine sand would be excavated in area BN-1 and spoiled on site or removed to an appropriate location. Approximately 550 CY of coarser alluvium would be acquired to provide the fill material needed for re-contouring area BN-1. This surface would then be planted with native riparian vegetation, such as willow, cottonwood, and sedges. Area BN-2 covers the remaining downstream portion of this activity area. Work in area BN-2 would consist of riparian planting only. Both areas would be irrigated as necessary. The purpose of this activity area is to improve riparian habitat conditions along the Trinity River and to develop a demonstration site for landowners who may be interested in promoting native riparian vegetation and natural river conditions on private lands. The contoured and developed gravel and revegetated Project areas are expected to: provide increased low velocity fish habitat at flows that are greater than base (450 cfs flows); provide terrestrial input to the river (e.g., invertebrates and woody material); and increase vegetation available for riparian obligate species (e.g., migratory birds).

Upstream of the Douglas City Bridge:

R-1 – High Flow Channel

Area R-1 includes construction of a 1,500 to 2,000 cfs high flow scour channel and would require excavation of approximately 2,200 CY of material 1 to 3 feet deep. Actions would avoid large trees and the area would be planted with wetland and riparian patch types and willow clumps. Large wood would be placed throughout the constructed surfaces. The purpose of this activity area is to increase groundwater elevations from the backside of the floodplain; improve riparian natural regeneration and planting success; increase the complexity of the floodplain; and provide off channel juvenile rearing opportunities for flows greater than 2,000 cfs.

R-2, R-3 – Side Channel Enhancement: Bank Lowering and Shaping

Area R-2 consists of excavation activities that would lower surfaces adjacent to the existing and proposed side channel. Bench inundation would vary from 450 cfs to 2,000 cfs throughout the activity area. Excavation of approximately 1,500 CY of material is expected. Wetland and riparian patch types and willow clumps would be planted and large wood would be placed throughout constructed surfaces. Work in this activity area would avoid areas of existing vegetation. The purpose of this activity is to promote off-channel juvenile rearing areas that meet depth, velocity, and cover criteria when flows are greater than 2,000 cfs; provide areas for natural riparian recruitment; promote development of patchy riparian vegetation; increase floodplain and side channel complexity; and increase large wood storage.

IC-1 – Left Bank Skeletal Bar, Alcove, & Large Wood Habitat Structures

Area IC-1 activities include placing approximately 3,800 CY of coarse sediment (3 to 8 inch diameter) in combination with wood and vegetation, so that the bar does not move downstream. Construction would incorporate the alcove and scour channel along the right bank and include large wood 1-2 feet in diameter along the high flow scour channel and at the head of the skeletal bar to help shoal flows into IC-2 and maintain IC-1 in place. The purpose of this activity area is to promote right bank scour and force mainstem capture into IC-2. Activity area IC-1 works with the IC-2 activity area to create a forced meander and increase sinuosity and channel complexity; promote pool development on the outside of the meander; provide juvenile rearing areas that meet

depth, velocity, and cover criteria for targeted flows of 300 to 2,000 cfs; increase large wood storage and retention; and increase sediment storage and retention.

IC-2 – Side Channel Enhancement: Bank Lowering and Shaping

Area IC-2 actions include lowering the surface to construct a new mainstem channel by excavating approximately 12,000 CY of material (half meander wavelength) making the thalweg 2-6 feet deeper than the existing mainstem channel. Large wood would be placed along the right bank of the constructed mainstem channel. A skeletal bar would be constructed from the existing left bank of the island through an existing side channel so that the low flow channel width of the constructed mainstem channel is < 75 feet at 450 cfs (approximately 750 CY). Portions of existing islands would be removed to promote mainstem capture. Wetland and riparian patch types and willow clumps would be planted and large wood would be placed along the right bank of the constructed surfaces. Activity area work would avoid existing vegetation or incorporate it into the design feature. The purpose of this activity area is to increase mainstem channel complexity and sinuosity; increase fry and juvenile rearing habitat that meets cover, depth, and velocity criteria for targeted flows of 300 to 2,000 cfs; provide areas for natural riparian recruitment; promote mainstem deposition; increase yellow-legged frog habitat; increase bed and bank scour; and increase adult holding habitat.

IC-3 – Right Bank Skeletal Bar, Alcove, & Large Wood Habitat Structures

Area IC-3 activities include placement of approximately 1,000 CY of coarse sediment (4 to 8 inches in diameter), incorporation of an alcove and scour channel along the right bank, and incorporation of large wood 1-2 feet in diameter in the high flow scour channel and at the head of the skeletal bar. The purpose of this activity area is to: confine flows and promote left bank scour into bedrock in order to deepen existing adult holding; increase sinuosity and channel complexity; provide juvenile rearing areas that meet depth, velocity, and cover criteria for targeted flows of 300 to 2,000 cfs; and increase large wood storage.

IC-4 – Side Channel Enhancement: Large Wood Placement & Bar Building

Area IC-4 activities include placement of large wood (0.5-2 feet in diameter and greater than 10 feet in length), with root balls facing upstream, within the existing side channel and placement of approximately 3,000 CY of coarse sediment. The small wood habitat structures are intended to provide additional cover for salmonids within constructed habitat features (side channels, swales, alcoves, and rearing ponds). They would be placed in close proximity to reduce distance to cover and improve rearing habitat. They typically are made up of approximately five large wood pieces with several racked members, and would be partially backfilled with woody slash and native alluvium. The purpose of this activity area is to: promote off-channel juvenile rearing areas that meet depth, velocity, and cover criteria for targeted flows of 300 to 2,000 cfs; increase channel and floodplain complexity by promoting local bank and bed scour and deposition; increase large wood storage; increase channel complexity and sinuosity; increase coarse sediment storage; create sites for riparian regeneration by reducing flow velocities and encouraging deposition of sediment and nutrients on the floodplain; create off-channel habitat for non-riverine species (e.g., turtles); and capture woody material mobilized by high flows and transported from upstream.

X-1 – Temporary River Crossing

Temporary crossings provide access across the river or a tributary in this case. This temporary crossing over Weaver Creek would consist of a temporary bridge or other site improvements to

facilitate access for construction-related traffic. X-1 would provide access to all the river right work upstream of the Douglas City Bridge within the site boundary including the U-1 spoils area for use in all Project phases.

C-2, C-7 –Access Roads

Construction access roads are classified as existing or temporary. Access roads are classified based on the public or private landowners' goals and objectives for their property. C-2 designates existing access roads and C-7 designates temporary access roads. Within the Project site, existing access roads would predominantly be utilized. Because scrapers would likely be utilized for excavation of channels and floodplains, these continuous loop haul roads would be essential for safety and efficiency. Post-Project, access roads would be returned to pre-construction condition, decommissioned, or left as improved, according to landowner approval.

C-3, C-4, C-10, C-11 – Contractor Use Area

Contractor use areas would be used for construction access, staging, stockpiling, mobilization, gravel processing, and other necessary construction activities during implementation. These contractor use areas are designated primarily as support areas, though boulders may also be taken from these zones (activity K) for use in-river. Depending on landowner goals and objectives, each contractor use area may be improved back to pre-construction condition or decommissioned.

Revegetation (Upstream and Downstream of Douglas City Bridge):

The Douglas City revegetation design mimics vegetation patterns found on different landforms of less disturbed regional streams and is similar to developing designs using a zonation approach (Hoag 1999; Hoag and Landis 1999). The revegetation approach to the Douglas City site varies on the type of design element constructed or existing conditions within the Project area. The Douglas City grading plan avoids removing patches of existing riparian vegetation within the site that currently provide cover and a readily available seed source immediately after construction. The existing side channel slopes would be planted to provide cover for wildlife and fish, shade the channel, speed riparian vegetation recovery, and increase woody plant and age class diversity. Constructed benches and bars are specifically targeted for woody riparian revegetation. A variety of plant clusters with a combination of species would be planted. During revegetation at the Douglas City site approximately 1.3 acres of zonal planting would occur in addition to 139 riparian clusters and 47 upland clusters (see Table 4).

At this site, upland plant clusters with combinations of different native species associated with naturally occurring terraces adjacent to the site would be planted. Habitat continuity and ecotone diversity between the riparian corridor and adjacent upland areas at channel rehabilitation sites is important for maintaining wildlife corridors, which function to facilitate local movement and critical proximity to and from food, cover, and water.

Open areas on previously constructed benches that already flood more frequently would be planted with an arrangement that promotes greater riparian patch interior area, continuity with existing vegetation, and increases riparian corridor width. The revegetation planting design also increases the area and structural diversity of remnant riparian vegetation after construction by planting tree and shrub species together to complement existing vegetation. Revegetation is planned to cover greater area and be less linear in shape than the existing riparian vegetation at the site.

Lorenz Gulch Rehabilitation Site

The following section provides information about the activities proposed at the Lorenz Gulch Rehabilitation Site. Details are provided in Table 3. Activities at this site are proposed for construction beginning in 2013, as funding is available. Revegetation details for this site are included at the end of this section.

IC-1, IC-7 – Boulder Habitat Placement

In the IC-1 and IC-7 activity areas, boulders would be placed in clusters within an existing run to enhance adult holding. There would be four clusters comprised of four to six, 4-foot diameter rocks each. When placed in the river they would have localized effects on gravel deposition within the vicinity of the boulders. These features would create localized eddies and local variations in velocity and flow direction. These localized variations in hydraulics and creation of "pocket water" would create small holding areas for adult fish.

IC-2 – Large Wood Structure – Engineered Log Jam

The large wood structure at IC-2 would be placed to constrict the width of the Trinity River. It would be comprised of large wood stems with intact rootwads, large wood stems, tree tops, wood slash and brush, and alluvium. This ELJ would consist of 30 or more logs specifically designed for placement in this location. The ELJ would be designed to persist through all ROD flows and would likely require a crane mounted hammer for installation of vertical piles. This structure would have an approximately 30 foot by 30 foot footprint, with a variable height up to 11 feet above the channel bed. Wood estimates are for 25 rootwads with stems 12 to 24 inches in diameter, 25 tree stems 12 to 24 inches in diameter, 125 CY of slash and tree tops with intact branches, and approximately 650 CY of alluvial backfill with particle sizes 12 inches in diameter and smaller. The purpose of the structure is to cause flow constriction (hydraulic diversity), expansion, and scour; rack mobile wood; and provide cover for all life stages of salmonids (habitat diversity). It would increase wood loading and retention in the Project reach. It is anticipated that scour would be generated along the edge of structure. Construction of this feature would create cover and eddy zones that increase and enhance areas suitable for salmonid rearing, resulting in a local increase in holding habitat in areas of scour.

IC-3/IC-4 – Split Flow Channel Complex with Medial Bar and Engineered Log Jam

This element consists of a split flow channel (IC-3) around a vegetated medial bar/island (IC-4) located between the current alignment of the Trinity River and the proposed flow split. The IC-3 split channel would be 500 feet long and require 10,900 CY of excavation. The IC-4 island would be 0.35 acres in area and would require 3,300 CY of fill. The IC-4 bar/island would utilize existing ground and vegetation on the eastern half, whereas the western half would be constructed by placing native alluvium ranging from gravel to 12-inch diameter boulders along the existing right bank of the river. The mixture of materials would generally not be mobile, but would rather provide a mixture of particle sizes to interlock in long term maintenance of the vegetated medial bar. The head of the island would be anchored with a large wood structure with a top elevation near the 7,500 cfs water stage. This ELJ would consist of 30 or more logs specifically designed for placement in this location. Mature trees present on the IC-4 island feature are expected to recruit to the channel over time, while natural riparian establishment and succession would provide cover and sustain wood recruitment into the future. The large wood structure at the apex of the IC-4

island is expected to rack mobile wood and increase residence time of wood in the reach. The split flow channel itself is sized to carry approximately 50 percent of the mainstem Trinity River flow at all discharge levels. The split flow complex would create several directional changes in flow, with flow accelerations, eddies, shallow water shoreline, and greater hydraulic complexity than exhibited by existing conditions. This feature would create additional area for fry and juvenile rearing by effectively doubling the length of wetted edge throughout the footprint of the structure, providing additional cover, and increasing hydraulic variability over existing conditions. This element would provide additional rearing habitat over a range of low to intermediate discharge levels by increasing shoreline length, shallow water area, eddies, and cover.

IC-6 – Berm Removal

The berm removal at the IC-6 activity area involves removal of 380 lineal feet of riparian berm and fine sediment on the left bank of the Trinity River near RM 90.1. Berm removal at this location would create a channel expansion immediately upstream from an existing riffle, which would enhance spawning habitat by encouraging gravel deposition on the riffle head. In addition, removal of the fine sediment along the left bank would enhance the hydraulic connectivity between the mainstem Trinity River and the R-2 side channel by shortening the groundwater flow path into the R-2 channel and eliminating fine sediment that could reduce substrate permeability. The IC-6 feature is expected to re-establish vegetation in the long term, at locations and elevations corresponding to the ROD flow regime. Additional gravel deposition is expected to improve spawning habitat on the nearby riffle head. Some additional shallow wetted edge would be provided at intermediate flows, with cover developing over time. Anticipated benefits from site evolution include enhanced spawning on the nearby riffle due to deposition of smaller gravel than is currently present on the riffle.

R-1 – Low Flow Side Channel on Right Bank with IC-5 Wood Habitat Structure

The R-1 activity area consists of a baseflow side channel that maintains a year-round surface water connection to the mainstem Trinity River at both ends. To assist in maintaining flow into the side channel and to increase habitat and hydraulic diversity, a large wood habitat structure would be placed at the head of the island created by construction of the R-1 side channel. The R-1 side channel is intended to immediately provide fry and juvenile rearing habitat. The R-1 side channel would increase fry and juvenile rearing habitat availability at all flow levels. Rearing habitat conditions would be optimal at low and moderate discharge levels, and rearing area availability would increase over existing conditions at all discharges. The IC-5 habitat structure (as well as the one proposed at activity area IC-8) would be a relatively small wood structure as compared to the proposed ELJs and would probably be constructed with less than 15 logs.

R-2 – Hyporheic Side Channel / High Flow Channel

Flow in the R-2 side channel would be supplied through a hyporheic (subsurface water flow) connection at its upstream end when mainstem discharges are less than 3,000 cfs. The inlet to the side channel would begin to inundate at 3,000 cfs, at which time the side channel would begin to convey surface flow. The R-2 feature would increase the availability of salmonid rearing habitat over a wide range of discharges. The side channel would add about 2,400 feet of additional wetted margin with cover that is available at all flow levels. The area of available habitat increases as the associated R-3 floodplain becomes inundated at flood discharges. This feature would provide additional fry and juvenile rearing habitat at all flows.

R-3 – Floodplain and Banks along Left Side Channel with IC-8 Wood Habitat Structure to Maintain Downstream Alcove

The R-3 activity area is a floodplain corridor excavated from the left side terrace along the R-2 side channel. A large wood habitat structure would be constructed on the left bank of the R-2 and R-3 activity areas, where these confluence with the mainstem. This structure would be smaller than the ELJs proposed at IC-2 and IC-4 and would probably be comprised of less than 15 logs. The IC-8 habitat structure would maintain the alignment of the side channel's outflow (alcove) into the mainstem so that high flows would scour and maintain depths over time. The area would be planted with riparian vegetation to establish vegetation in a terrace area that is currently of little ecological value. Once these surfaces become vegetated they would provide short and long term cover for wildlife and fish, shade the channel, and increase woody plant diversity. The overall tendency of the side channel overbank areas is depositional, and it is anticipated that these areas would accumulate fine sediment over time. This floodplain would increase the suitable area for fry and juvenile rearing during flood events.

R-4 – Floodplain on Left Bank

Work in activity area R-4 involves excavation of coarse terrace alluvium along the left bank to create a floodplain with complex topography. The topography of the R-4 floodplain surface includes a swale that grades into a base-flow alcove that inundates progressively with rising discharge. This aspect of the feature's topography is intended to minimize flow conveyance and flow velocities across the floodplain, thereby maximizing rearing habitat within the feature boundaries at higher flow levels and maintaining stream power in the mainstem. The purpose of the R-4 floodplain is to provide salmonid rearing habitat over a wide range of intermediate and high flows, as well as to promote the development of riparian vegetation and wildlife habitat in an area that is presently occupied by a terrace surface with low ecological value. To optimize riparian recruitment, the floodplain is designed so that a significant portion of surface is inundated at 3,000 cfs. However, portions of the surface nearer the margin of the existing mainstem channel remain emergent at flows up to about 4,500 cfs. This feature would increase rearing habitat area and hydraulic refugium at all flows, with the largest increases occurring when discharge is greater than 4,500 cfs.

R-5 – Alcove

The R-5 alcove/floodplain would require excavation of 3,000 CY and is intended to provide both functions of a floodplain and an alcove, depending upon the stage of the Trinity River. At low discharges, below approximately 7,500 cfs, the R-5 feature is inundated from downstream, like an alcove. There is some circulation through the feature, and water is not completely still. At discharges in excess of 7,500 cfs, the feature exhibits flow-through in a downstream direction, with water overtopping at the upstream end and flowing downstream. The frequency of flow-through connection is approximately every other year. By nature, this feature is depositional and contains ground surfaces with suitable soils and moisture content for growing vegetation. Future evolution would depend upon the balance between the frequency of high discharges that disturb vegetation and scour fine sediment, balanced with the establishment of vegetation and retention of fine sediments. The feature is largely backwatered from downstream for most time periods. However, at discharges in excess of 7,500 cfs, the feature exhibits flow from upstream to downstream and can be considered as a conveyance area part of the active channel. The R-5 activity area would create

habitat suitable for fry and pre-smolt Chinook salmon at all discharges, however, the design specifically targeted the creation of additional habitat at flows where the "dip" in Trinity River available habitat occurs, at approximately 800 to 2,000 cfs.

W-1 – Pond

Activity area W-1 is a pond that would be excavated into the left terrace adjacent to the R-2 side channel. The pond's inlet and outlet would both connect to the R-2 side channel. The pond would be fully disconnected from other surface water at baseflow, but become connected through its outlet at about 2,000 cfs. The inlet would be overtopped at 4,500 cfs, allowing flow through the pond to begin at that discharge. The pond is designed to provide a range of water depths, including deep areas needed for thermal stratification. It would be bounded by areas of terrace lowering designed to provide areas for the establishment of riparian vegetation. It is likely that the pond would accumulate fine sediment and organic matter over a long timeframe and eventually evolve to become a wet meadow. The pond would increase habitat available to western pond turtle and yellow-legged frog, and would provide off-channel rearing habitat for juvenile Coho salmon. The pond would provide connected rearing habitat and refugia during peak events, as well as year-round off-channel rearing habitat.

X-1 – Temporary River Crossing

Construction of a temporary ford crossing over the Trinity River is proposed at the X-1 activity area to provide access for vehicles and construction equipment during low-flow conditions (approximately 300 to 600 cfs). This temporary ford crossing would be designed and constructed to meet the requirements for heavy equipment such as trucks, excavators, and scrapers. Due to requirements to retain navigability and minimize impacts to aquatic resources, at least 1/3 of this ford crossing would be submerged to a depth of at least 1 foot under low-flow conditions. The ford crossing would be constructed using native alluvial materials excavated from the bed and bank of the Trinity River, from activity areas, or adjacent sources. Vehicular crossings to the left bank would be minimized to reduce the potential for a spill of hazardous materials into the river.

U-1 – Access Improvements, Boulder Harvest, and Spoils Area

Work in the U-1 activity area includes improving the parking and access at the Hidden Bar area as well as restricting vehicular access in the riparian (e.g., R-1) and downstream (e.g., C-7) areas on the right bank. Improved public access would include a developed boat ramp and parking area, and potentially, addition of a toilet in the future. Vehicular access would be restricted from the river corridor in conformance with the BLM Redding RMP; this exclusion of vehicles would also improve water quality. A portion of this activity area is designated for disposal of excess excavated soil and gravel, beyond that needed for improvements. Excess excavated material would be placed and contoured in a manner that has minimal impacts to riverine, wetland, and cultural site features.

U-2, U-3 – Upland Spoils

Materials excavated from river right would be spoiled in the U-2 area. Materials excavated from river left would be spoiled in the U-3 area to stay above the maximum fishery flows (MFF; 11,000 cfs plus spring tributary accretion) and FEMA 100-year floodplain boundaries. The U-3 footprint would be minimized as possible to reduce impacts to existing habitat. Prior to spoiling, boulders would be opportunistically harvested from the location for use in the Project. Use of the U-3 area would result in minimal impacts to riverine, wetland, and cultural site features. The area would be

revegetated post-project; in the long term, revegetation would support development of native species seed sources and may provide for recruitment of LWD to the Trinity River.

C-1, C-4, C-5, C-6 and C-7 – Contractor Use Areas

Construction access, staging, stockpiling, mobilization, and other necessary construction activities for the contractor to use as necessary during the implementation period would occur in these activity areas. These contractor use areas are designated primarily as support areas, though boulders may also be taken from these zones (activity K) for use in-river. The main contractor use area is a large flat area located on river right adjacent to Steiner Flat Road on the BLM river access property. The C-1 activity area would provide temporary construction access to the river for construction of instream features in the Hidden Bar area. Decompaction of the downstream portion of the bar would occur post-construction to address consolidation from vehicle traffic. The upstream portion of the Hidden Bar (in C-1) would be developed into a boat launch. Increased bar mobility would result post-project due to decompaction of the bar, in conjunction with restricted vehicle access to the downstream portion of the bar post-construction.

C-2 – Existing Access Road

C-2 is an existing access road that would be utilized to access features for construction and to transport materials. Minor clearing, grading, shaping, or decommissioning of roads onsite would occur according to BLM (land management plan) guidance. Portions of the existing road network would be decommissioned after construction to prevent vehicular access within the active river channel and C-7 area. Vegetation would be established post-project.

C-3 – Natural Forest Health Area

The 11 acre C-3 activity area is an upland area located in Township 33 North, Range 10 West, in the SE corner of Section 35, on a hillslope along the left bank of the Trinity River. The C-3 area includes tree densities often in excess of 200 per acre with 100 percent canopy closure. Consequently, the area is targeted for selective removal of approximately 160 small and suppressed-growth trees in order to achieve stand conditions that would be more reflective of historical mature forest conditions. Thinning would occur on slopes less than about 30 percent (about 2/3 of the C-3 area). The Natural Forest Health Area would seek to accelerate the development of habitat that is representative of the mature old growth forest that historically existed along the Trinity River. Implementation of the following management actions would accelerate development of post-project target conditions; however, even with Project implementation, development of these mature stand conditions would require time (10-30 years) to develop depending on the exact location. Desired Future Conditions would include: 1) mean diameter at breast height (dbh) of trees > 18 inches; 2) canopy closure of > 60 percent; 3) dominant trees of > 60 feet tall; 4) an average of about 15 trees per acre between 18 and 35 inch dbh; and 5) a stand of dominant conifers (six trees per acre) that are 35 inch dbh or greater.

Selective removal of smaller trees (generally 6 to 20 inch dbh with none exceeding 30 inch dbh), would set the trajectory for Desired Future Condition of the C-3 area and would provide a source of intermediate and smaller sized wood material to be used for construction of ELJs and wood habitat structures. Conifers that are encroaching on large oak and madrone trees (e.g., >20 inch dbh) would be prioritized for removal in order to release these hardwoods for continued and faster growth.

Trees would be selectively marked for removal in the field by a BLM forester in coordination with biological and cultural resource staff. No entry zones for heavy equipment would be marked by the BLM cultural resources staff. An excavator would retrieve marked trees with root wads and limbs intact, as possible. Chainsaws would be used to remove selected trees from steep areas adjacent to marked access and wood removal routes. Trees cut with chainsaws would be skidded to the designated wood removal trails. Trees and slash would be removed by an excavator or loaded via logging tongs along designated skid paths to the C-5 contractor use area. The wood material would be stockpiled and sorted for use in construction of in-river wood structures. Following tree removal, skid trails would be decommissioned and the landscape rehabilitated to natural conditions.

This action would establish conditions conducive for old growth trees to increase vigor, thereby decreasing susceptibility to insects and disease, and establishing a stand that is more resilient to fire. In addition to providing a source of large wood material for construction, this action would help maintain riparian shading and future wood loading to the Trinity River. It is anticipated that approximately 40 additional trees (6 to 20 inch dbh) would be marked by BLM staff throughout the site boundary for selective removal in order to enhance safety and forest health within the Project site boundaries.

Revegetation

The Lorenz Gulch revegetation design mimics vegetation patterns found on different landforms of less disturbed regional streams and is similar to developing designs using a zonation approach (Hoag 1999; Hoag and Landis 1999). The revegetation approach to the Lorenz Gulch site varies on the type of design element constructed or existing conditions within the Project area. The grading plan avoids removing patches of existing riparian vegetation within the site that currently provide cover and a readily available seed source immediately after construction. The existing side channel slopes would be planted to provide cover for wildlife and fish; shade the channel; speed riparian vegetation recovery; and increase woody plant and age class diversity. Constructed benches and bars are specifically targeted for woody riparian revegetation. A variety of plant clusters with a combination of species would be planted (approximately 1.8 acres of zonal planting and 28 riparian clusters are planned; refer to Table 4). No upland plant clusters would be planted.

Over the long term, revegetated areas should be greater in area and more structurally complex than existing vegetation at the site. Trees, shrubs, forbs and herbs would be planted along side channels and islands of remnant riparian vegetation to immediately improve the complexity of aquatic habitats in the 300 cfs to 2,000 cfs range, and to cover areas where less preferable plant species could grow (i.e., sweet-clover (*Melilotus* spp.), Bermuda grass (*Cynodon* spp.), Himalayan blackberry (*Rubus discolor*), and narrowleaf willow (*Salix exigua*)).

2.4.2.3 Common Activities and Construction Criteria and Methods Associated with the Proposed Project

In addition to the activities included in Tables 2 and 3, several other activities are common to all activity areas to varying degrees. These common activities (vegetation removal, watering, and monitoring) are briefly discussed in Appendix A. Appendix A also provides a general overview of the construction process for the Proposed Project. Earthmoving equipment that may be used at the sites to complete the construction activities includes off-road articulated dump trucks, wheel

loaders, tracked excavators, dozers, push-pull scrapers, water tenders, and graders. Monitoring would occur as a required element of the Proposed Project and responds to the TRRP program management objectives, as well as the elements of the Mitigation Monitoring and Reporting Program (MMRP) required pursuant to CEQA. The MMRP, included as Appendix E of the Trinity River Master EIR, is incorporated in its entirety by reference. Specific mitigation measures proposed as part of the MMRP for the Proposed Project are included as Appendix A of this EA/IS.

2.4.2.4 Tentative Schedule

Preliminary designs for these sites were developed beginning in 2010 and the Proposed Project, which incorporates landowner and TRRP design input, was completed in early 2013. The majority of the Proposed Project (all the actions at Lorenz Gulch; actions at Douglas City that are downstream of the Douglas City Bridge; and the bank naturalization work) would be constructed in 2013 between June and December, as funding is available. All in-river construction and left bank activity areas at Lorenz Gulch would be completed by September 15th, the end of the in-river work period. A portion of the actions proposed at the Douglas City site – those in the Douglas City Bridge upstream portion, would be completed beginning in 2014.

Construction associated with the Proposed Project would not begin until the environmental process is completed. In addition, the following must have been completed: the final designs, plans, contract specifications, and cost estimates; award of contract(s) for work; hazardous materials site assessments; acquisition of rights-of-way; acquisition of permits; and design approvals from local, state, and federal agencies.

To minimize impacts to breeding birds, construction would typically begin after nesting (August 1), but could begin sooner if pre-August bird surveys determine that nesting birds would not be impacted by construction. Surface disturbance activities may be limited during the late spring (May and June), depending on the flow release schedule established for the particular water year. Although the majority of excavation and grading activities would typically occur between July 15 and November 1, excavation may continue later as long as surface water runoff does not increase the mainstem Trinity River turbidity by > 20 percent (Trinity River summer turbidity is typically very low; < 2 nephelometric turbidity units [NTU]).

Revegetation (placement of rooted plants, willow clumps salvaged from the site, and pole cuttings) may begin during the summer season especially in those locations on river left at Lorenz Gulch where access would be limited to non-vehicular traffic after September 15th. Additional revegetation work (planting of willow pole cuttings and/or container plants, and seeding with native grasses) would take place in the wet season (fall/winter) following work or a year after construction.

2.5 Alternatives Considered but Eliminated from Further Evaluation

In addition to the alternatives described above, the following alternatives were also considered but dismissed for the reasons provided.

2.5.1 At Douglas City

In an earlier version of the Douglas City Project, sloping the right bank of the Trinity River just downstream of the Douglas City Bridge was considered. However, sediment input from Weaver

Creek was expected to maintain the Trinity River along the left bank and to minimize potential for the site to create and maintain juvenile rearing habitat. Options to add coarse sediment were also considered at this site but reconsidered in light of the available coarse material moved downstream from the Weaver Creek and Indian Creek tributaries.

2.5.2 At Lorenz Gulch

At Lorenz Gulch the designers considered development of a low flow side channel on river left that maintained flow during base Trinity River flows. The mouth of the side channel would have been maintained by a hydraulic structure. However, this option was reconsidered as the designers desired to maintain stream power and the ability of the river to scour the downstream adult holding habitat (e.g., Goat Hole). It was expected that such a low flow side channel might have taken water and stream power away from the mainstem Trinity at all flows. Addition of a hydraulic structure at that location may have also deepened important riffle habitat in the reach. In earlier draft designs, the Lorenz Gulch Project included a different sized split flow channel and various amounts of surface flow and hyporheic flow were considered in sizing the R-2 side channel. Finally, the W-1 pond was changed in location so that removal of an existing riparian patch was not necessary.

At both Project sites the designers are continuing to refine designs that are presented in this document. Within the general confines of the defined activity areas and ESLs, the designers are using models to inform themselves as to the potential effects that changes in constructed topography (how the features are built – using various grades, side slope angles, and elevation on the ground) might have on how constructed features function under various flow conditions. At both sites, the designers have been evaluating how these relatively minor changes in design affect modeled water depths, velocities, and sheer stresses under post construction conditions and how these results might affect long-term maintenance/evolution of features. The models may suggest that a feature will maintain itself or fill in under high flow conditions. Results of modeling are being used to select optimal configurations for maximum aquatic habitat quality for juvenile salmonids (e.g., depth, velocity, and substrate) in as-built conditions and as conditions evolve (e.g., erode, aggrade, or vegetate) under envisioned ROD flow conditions.

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Chapter 3

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction to the Analysis

This chapter describes the existing resources at the Douglas City and Lorenz Gulch Rehabilitation sites and presents an analysis of the potential environmental impacts associated with implementing the proposed activities. The anticipated impacts of the alternatives, including those required for both CEQA and NEPA, are analyzed in this chapter. The analyses are presented by environmental resource area. The analysis for each resource area includes discussions of the existing environmental setting, applicable significance criteria, potential environmental impacts, and mitigation measures. The contents of each of these discussions are described briefly in the following subsections.

3.1.1 Affected Environment/Environmental Setting

The affected environment/environmental setting section for each resource area describes the existing conditions using the most current information available. Conditions existing at the time of the Notice of Preparation for the Trinity River Channel Rehabilitation and Sediment Management for Remaining Phase 1 and Phase 2 Sites Master EIR (March 2008) are used to establish the environmental baseline for CEQA purposes (CEQA Guidelines Section 15126.6(e)(1)). Throughout the remainder of this document, this baseline will provide the basis for determining whether the Proposed Project's environmental impacts are likely to be significant.

3.1.2 Environmental Consequences/Impacts and Mitigation Measures

Under CEQA, the concept of environmental "impacts" or environmental "effects" (the terms are used synonymously), as well as the determination of the significance of those impacts, is focused on changes in the existing physical conditions in the affected environment. The impacts of these projects are identified and the level of significance of the impacts is determined in the following sections of this chapter. The impact analyses consider the type, size, location, and intensity of the potential effects associated with the activities proposed at the Douglas City and Lorenz Gulch Rehabilitation Sites. The subsections presented in the Environmental Consequences section for each resource area are described briefly below.

3.1.2.1 Methodology

This subsection identifies the methods used to analyze impacts, as well as the key assumptions used in the analysis process.

3.1.2.2 Significance Criteria

This subsection presents the criteria and thresholds used to identify potentially significant effects on the environment, in accordance with PRC section 21082.2 and CEQA Guidelines sections 15064 and 15065. "Thresholds" include guidance provided by the CEQA Guidelines, agency standards,

legislative or regulatory requirements as applicable, and professional judgment. All impacts that do not exceed the stated significance criteria described for each section are assumed to be less than significant and are therefore not discussed in detail (PRC, § 21100 and CEQA Guidelines § 15128).

3.1.2.3 Summary of Impacts Table

At the beginning of the Impacts and Mitigation Measures subsection is a table that identifies all of the impacts evaluated for that particular environmental issue area. Included in this summary table are the various levels of significance (i.e., no impact, less than significant, significant) for the Proposed Project and No-Project alternatives. The tables also indicate what the level of significance would be after mitigation is implemented.

3.1.2.4 Impacts and Mitigation Measures

In this subsection, each impact statement is presented followed by a detailed impact analysis. Mitigation measures that would reduce significant impacts associated with implementation of the Proposed Project to less than significant levels are identified after each impact discussion and are provided in Appendix A. An alphanumeric coding system that corresponds to the mitigation measures found in Appendix E of the Master EIR is used to identify each mitigation measure.

3.1.3 Mitigation and Monitoring Program

California PRC section 21081.6, subdivision (a), requires lead agencies under CEQA to "adopt a reporting and mitigation monitoring program… in order to mitigate or avoid significant effects on the environment." Mitigation measures that will be implemented in association with the Proposed Project are clearly identified and presented in Appendix A in language that will facilitate establishment of a monitoring and reporting program. In addition, Appendix A includes a number of design elements and construction criteria that are incorporated into the Proposed Project. Relevant information described in Appendix A will also be included as environmental commitments in conjunction with any mitigation measures adopted by the Regional Water Board as conditions for Project approvals. The conditions for Project approvals will be included in a MMRP to verify compliance. The MMRP for this Project is included as Appendix A. The approval of such a program will be part of any action taken by the Regional Water Board with respect to the Proposed Project. When other state, regional, or local agencies subject to CEQA approve portions of the Proposed Project under their jurisdiction or regulatory power, these "responsible agencies" will be required to adopt their own MMRPs (Cal. Code Regs., tit. 14, § 15097, subd. (d)).

3.2 Land Use

This section describes existing and planned land uses in the vicinity of the Proposed Project and evaluates the potential impacts to land uses from Project implementation. More information about this resource is presented in the Trinity River Master EIR (Section 4.2) and that information is incorporated herein by reference.

3.2.1 Affected Environment/Environmental Setting

3.2.1.1 Existing Land Uses

The land within the Douglas City Rehabilitation Site boundary (141.14 acres) is a mixture of public and private land. The BLM manages the largest portion of public lands within the ESL (91.65

acres); the remainder of the public land is managed by the state (18.41 acres), Reclamation (5.15 acres), and Trinity County (0.58 acres). In addition there are 25.25 acres of private land within the ESL. All of the land within the Lorenz Gulch Rehabilitation Site ESL (83.82 acres) is managed by the BLM. Public land in and adjacent to the Proposed Project sites is primarily used for resource management and recreation and is managed for multiple uses in conformance with specific agency guidance documents. BLM-managed lands are administered in accordance with BLM's Redding RMP, and USFS lands are managed in accordance with the STNF Land and Resource Management Plan (LRMP). These plans discuss the general condition of natural resources in the respective plan areas and prescribe appropriate land use management for lands within the plan jurisdiction. Relevant land use plans are summarized in Section 4.2.2 of the Trinity River Master EIR.

Weaverville is the largest community in Trinity County with a 2010 population of 3,600 (U.S. Census Bureau 2011). It is located 45 miles west of Redding on SR-299 adjacent to Weaver Creek, a tributary to the Trinity River. Douglas City, near the junction of SR-3 and SR-299 approximately 6 miles south of Weaverville, has an estimated population of 713.

The small community of Douglas City, which is near the Proposed Project sites, is situated adjacent to the Trinity River in areas where terrain is relatively gentle. Development in this rural community is primarily residential, typified by scattered single-family residences and mobile homes. The landscaping of residential developments within the Trinity River corridor has often encroached on the river's floodplain and that of its tributaries. The Trinity River near the Proposed Project sites is used by anglers, rafters, wildlife watchers, and tourists. The river is accessible at several public and private locations throughout the area.

Existing land uses typical of the area are primarily residential, timber and other resource production, recreation, and open space. In general, privately owned parcels within and adjacent to these sites have been subdivided to the fullest extent possible under existing zoning designations. Therefore, future rural residential development on the uplands, above the river's floodplain, would be minimal. Future development is further restricted by the proximity of parcels to the Trinity River; many of these parcels are zoned Flood Hazard and Open Space. Proposed channel rehabilitation activities would not result in any changes that would conflict with future proposed land uses.

The Douglas City Rehabilitation Site covers approximately 1 mile of channel, associated banks, and floodplain. The downstream portion of this site contains homes and other structures on river right and the upstream portion has homes on river left in a residential development off of Riffle Lane. In addition to several private parcels, lands within the site are managed by BLM, Reclamation, the state, and Trinity County.

The Lorenz Gulch Rehabilitation Site covers approximately 0.8 miles of river. The site is located along Steiner Flat Road downstream of Douglas City and begins 22.0 miles downstream of Lewiston Dam. The downstream end of the site concludes 0.2 miles upstream of the Dutton Creek confluence. All of the land at this site is managed by the BLM with some private parcels located on river right just outside of the northern end of the ESL. The upper half of the Lorenz Gulch site is dominated by a steep hill slope and bedrock on the left bank, and a primitive boat access and gravel bar on river right.

3.2.1.2 Local Land Use Planning

TRINITY COUNTY GENERAL PLAN

The Project sites are located in Trinity County. The Trinity County General Plan (Trinity County 2003) applies to privately owned lands in the Project area; these lands fall under several of the county's land use designations. The county has established zoning districts for planning purposes. For a detailed discussion of Trinity County General Plan land uses and definitions, refer to the Trinity River Master EIR (Section 4.2, Table 4.2-1).

DOUGLAS CITY COMMUNITY PLAN

The Douglas City Community Plan (Trinity County 1987) covers approximately 35 square miles (22,400 acres) centered on the Trinity River from slightly downstream of Grass Valley Creek to slightly downstream from Steiner Flat. Approximately 32.2 miles of river frontage exist in the rural community of Douglas City; private lands account for 46 percent of the lands bordering the river.

The Douglas City and Lorenz Gulch sites are within the Douglas City Community Plan area. The Douglas City Rehabilitation Site would be located in the Community Core neighborhood and the Lorenz Gulch Rehabilitation Site would be located in the Steiner Flat neighborhood. The neighborhoods in this area typically include Rural Residential, Village, Open Space, and Resource land use designations. These land uses occur at varying densities that generally reflect available public services and environmental constraints. Public and private fishing and river access areas occur throughout the plan area.

TRINITY COUNTY ZONING

The Trinity County Zoning Ordinance is discussed in Section 4.2 of the Trinity River Master EIR, including details about Trinity County zoning districts that apply to lands in the area. Significant portions of the Project sites are located in the 100-year floodplain of the Trinity River as determined by FEMA. Areas in the 100-year floodplain have been designated as Zone A, Zone AE, Zone X, and Zone X500 Flood Hazard Areas[5] and all sites within the 100-year floodplain are designated by Trinity County as Scenic Conservation Zones.

3.2.1.3 Relevant Land Use Plan

BLM's Redding Field Office manages public lands in the Trinity River Basin in accordance with BLM's Redding RMP (USDI BLM 1993) which in turn requires compliance with the Aquatic Conservation Strategy for Management of Habitat for Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl. This RMP discusses the general condition of natural resources in the plan area and prescribes appropriate land use management for lands within the plan jurisdiction including BLM-managed lands encompassed within the Proposed Project site boundaries. See section 4.2.2 in the Trinity River Master EIR for more information about the RMP and Appendix A of the Master EIR for the Project's Aquatic Conservation Strategy Consistency Evaluation. In addition to this general guidance, the BLM includes the following specific land use protection language for use in this Project:

On December 17, 2009, the U.S. District Court for the Western District of Washington issued an order in Conservation Northwest, et al. v. Sherman, et al., No. 08-1067-JCC (W.D. Wash.), granting

[5] Zone A is an area inundated by 100-year flooding for which no Base Flood Elevation (BFE = 100 year flooding water surface elevation) has been determined. Zone AE is an area inundated by 100 year flooding for which the BFE has been estimated. Zone X is an area inundated by 100-year flooding with average depth of less than one foot, or with drainage areas less than one mi^2, or areas protected by levees from a 100-year flood event. Zone X500 is an area between the 100 and 500 year floodplain.

Plaintiffs' motion for partial summary judgment and finding NEPA violations in the Final Supplemental to the 2004 Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines (USDA Forest Service and USDI BLM 2007). In response, parties entered into settlement negotiations in April 2010, and the Court filed approval of the resulting Settlement Agreement on July 6, 2011. Projects that are within the range of the northern spotted owl are subject to the survey and management standards and guidelines in the 2001 ROD, as modified by the 2011 Settlement Agreement.

The Douglas City and Lorenz Gulch Project is consistent with the Redding RMP, as amended by the 2001 Record of Decision and Standards and Guidelines for Amendments to the Survey and Manage, Protection Buffer, and other Mitigation Measures Standards and Guidelines (2001 ROD), as modified by the 2011 Settlement Agreement.

The Douglas City and Lorenz Gulch Project applies a 2006 Exemption from a stipulation entered by the court in litigation regarding Survey and Manage species and the 2004 Record of Decision related to Survey and Manage Mitigation Measure in *Northwest Ecosystem Alliance v. Rey*, No. 04-844-MJP (W.D. Wash., Oct. 10, 2006). Previously, in 2006, the District Court (Judge Pechman) invalidated the agencies' 2004 RODs eliminating Survey and Manage due to NEPA violations. Following the District Court's 2006 ruling, parties to the litigation entered into a stipulation exempting certain categories of activities from the Survey and Manage standards and guidelines, including both pre-disturbance surveys and known site management. Also known as the Pechman Exemptions, the Court's Order from October 11, 2006 directs:

> *"Defendants shall not authorize, allow, or permit to continue any logging or other ground-disturbing activities on projects to which the 2004 ROD applied unless such activities are in compliance with the 2001 ROD (as the 2001 ROD was amended or modified as of March 21, 2004), except that this order will not apply to:*
>
> *a. Thinning projects in stands younger than 80 years old:*
>
> *b. Replacing culverts on roads that are in use and part of the road system, and removing culverts if the road is temporary or to be decommissioned;*
>
> *c. Riparian and stream improvement projects where the riparian work is riparian planting, obtaining material for placing in-stream, and road or trail decommissioning; and where the stream improvement work is the placement of large wood, channel and floodplain reconstruction, or removal of channel diversions; and*
>
> *d. The portions of project involving hazardous fuel treatments where prescribed fire is applied. Any portion of a hazardous fuel treatment project involving commercial logging will remain subject to the survey and management requirements except for thinning of stands younger than 80 years old under subparagraph a. of this paragraph."*

Per the 2011 Settlement Agreement, the 2006 Pechman Exemptions remain in force:

> *"The provisions stipulated to by the parties and ordered by the court in Northwest Ecosystem Alliance v. Rey, No. 04-844-MJP (W.D. Wash. Oct. 10, 2006), shall remain in force. None of the following terms or conditions in this Settlement Agreement modifies in any way the October 2006 provisions stipulated to*

by the parties and ordered by the court in Northwest Ecosystem Alliance v. Rey, No. 04844-MJP (W.D. Wash. Oct. 10, 2006)."

The Douglas City and Lorenz Gulch Project meets Exemption C because it is a river restoration Project that incorporates the placement large wood, channel and floodplain reconstruction.

The TRRP Project reach is federally designated with a recreational status under the Wild and Scenic System. BLM is the federal river manager from Lewiston Dam to the North Fork Trinity. As the river manager, BLM must follow management guidelines identified in the WSRA. More information on Wild and Scenic River management is provided in the recreation section of the Trinity River Master EIR (4.8) and this EA/IS (Section 3.8). In addition, public lands in the Trinity River corridor are managed to meet the BLM Visual Resource Management Class II objective: "to retain the existing character of the landscape. The level of change to the characteristic landscape should be low." Therefore, management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape (USDI BLM 1993).

3.2.2 Environmental Consequences/Impacts and Mitigation Measures

3.2.2.1 Methodology

The methodology used for the land use impact analysis involved an assessment of the compatibility of the Proposed Project with relevant plans and policies and a review of the Trinity County General Plan, the Douglas City Community Plan, applicable land use plans, and zoning in relation to surrounding land uses and site features. The analysis was conducted through a literature review and site visits.

3.2.2.2 Significance Criteria

The following significance criteria were developed in the Trinity River Master EIR and are based on guidance provided by CEQA guidelines. Impacts to land uses would be significant if they would:

- Result in land uses that are incompatible with existing and planned land uses adjacent to actions described as part of the Project;
- Conflict with any applicable land use plan, policy, ordinance, or regulation of an agency with jurisdiction over the Project adopted for the purpose of avoiding or mitigating an environmental effect;
- Disrupt or divide the physical arrangement of an established community;
- Result in substantial nuisance effects on sensitive land uses that would disrupt use over an extended time period;
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use; or
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

3.2.2.3 Impacts and Mitigation Measures

Table 5 summarizes land use impacts that could result from implementation of the No-Project and Proposed Project alternatives.

Table 5. Summary of Potential Land Use Impacts for the No-Project and Proposed Project Alternatives		
NO-PROJECT ALTERNATIVE	**PROPOSED PROJECT**	**PROPOSED PROJECT WITH MITIGATION**
Impact 3.2-1. Implementation of the project could disrupt existing land uses adjacent to the rehabilitation sites.		
No Impact	Less than significant	Not applicable[1]
Impact 3.2-2. Implementation of the project could be inconsistent with the goals, policies, and objectives of the BLM RMP, the USFS LRMP, the Trinity County General Plan, or other local community plans, policies, and ordinances.		
No Impact	Less than significant	Not applicable[1]
Impact 3.2-3. Implementation of the project may affect the availability of a locally important mineral resource recovery site.		
No Impact	Less than significant	Not applicable[1]

[1] Because this potential impact is less than significant, no mitigation is required.

Impact 3.2-1: Implementation of the Proposed Project could disrupt existing land uses adjacent to the rehabilitation sites.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no restoration activities would occur. Therefore, there would be no impact.

PROPOSED PROJECT

The Proposed Project would not introduce a new land use within the boundaries of the sites, nor would it obstruct the water conveyance functions of the 100-year floodplain. Project activities that aim to restore floodplain functions would have long-term benefits for many land uses that are located along the Trinity River.

The Proposed Project is designed to minimize short-term disruptions to the community of Douglas City that could occur because of rehabilitation activities at the sites. Construction and staging areas would be located in and adjacent to the 100-year floodplain, which is designated as a Scenic Conservation overlay. All of the activities at the Lorenz Gulch Rehabilitation Site would be located on public lands (refer to Figure 3). A portion of the activities at the Douglas City Rehabilitation Site would be located on public lands (BLM, Reclamation, state, and Trinity County) but some would also be located on private lands (refer to Figure 2). Staging, construction, and access on private lands in and adjacent to the Douglas City site boundaries would require landowner approval. Work within adjacent road easements would require Trinity County encroachment permits and traffic control for ingress and egress. Residential development located within or near the rehabilitation sites would be outside the areas of direct impact associated with the Proposed Project. There are no residential developments within the Lorenz Gulch Rehabilitation Site ESL boundaries, but several residences are located to the east of the ESL at the downstream end of the Project. In contrast, the Douglas City Rehabilitation Site ESL encompasses private land which contains several private residences and Project staging and construction activities would occur in proximity to some of these residences. Although these sites have private residences within or adjacent to their boundaries, Project activities would not interfere with, preclude, or conflict with adjacent land uses.

Based on the analysis above, potential conflicts with or disruptions to adjacent land uses resulting from activities associated with the Proposed Project would be temporary and less than significant. As discussed in Section 3.16, Transportation and Traffic, no road closures would result from implementation of the Proposed Project. Access to adjacent residences would be maintained during Project construction and post-construction monitoring activities (refer to Appendix A).

Construction activities in the river channel could interrupt adjacent land uses for short periods; but they would not preclude the use of nearby businesses or residences. Construction and transportation associated with the Proposed Project could produce minor nuisance effects (i.e., air quality, visual resources, and noise) at some nearby residences; however, such impacts would be temporary and would not significantly affect the ability to use adjacent lands. Project impacts associated with air quality, visual resources, and noise are discussed below in Sections 3.11, 3.12, and 3.14, respectively.

Impact 3.2-2: Implementation of the Proposed Project may be inconsistent with the goals, policies, and objectives of the STNF LRMP, BLM's RMP, and the Trinity County General Plan, as well as local community plans, policies, and ordinances.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, rehabilitation activities would not occur. Therefore, there would be no impact.

PROPOSED PROJECT

Implementation of activities proposed at the Proposed Project sites would not introduce land uses that are incompatible with existing or proposed land uses, nor would rehabilitation activities conflict with any applicable land use plan, policy, or ordinance. The discussion provided for this impact in Section 4.2.2 of the Trinity River Master EIR summarizes the Project's consistency with federal, state, and local plans, policies, and ordinances. The impacts would be less than significant.

Impact 3.2-3: Implementation of the Proposed Project may affect the availability of a locally important mineral resource recovery site.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no rehabilitation activities would be implemented. Therefore, there would be no impact.

PROPOSED PROJECT

Although there are active mining claims within the Proposed Project sites, there are no locally important mineral recovery sites identified by the state within the boundaries of the sites. The TRRP has worked closely with the mining community to locate site boundaries in a manner that minimizes any impacts to future mineral recovery efforts and would continue to be involved in dialog with the mining community to address concerns related to mining. Because there are no state-identified locally important mineral recovery sites within the boundaries of the Proposed Project sites this impact would be less than significant.

3.3 Geology, Fluvial Geomorphology, Minerals, and Soils

Section 4.3 of the Trinity River Master EIR describes geologic, fluvial geomorphic, and soils resources in the vicinity of the Proposed Project sites and that information is incorporated herein by

reference. This section describes site-specific information important for the analysis and evaluates the potential impacts to these resources from implementation of the Proposed Project.

3.3.1 Affected Environment/Environmental Setting

3.3.1.1 Fluvial Geomorphology

A discussion of the regional and local fluvial geomorphology is included in the Trinity River Master EIR (Section 4.3). The geomorphic environment of the Proposed Project sites is directly affected by the hydrology, channel bed composition, sediment regimes, and riparian vegetation present. Modification of the channel and floodplain configuration has altered and simplified the natural diversity of geomorphic processes and products within the sites, hence limiting the variety of channel forms, habitats, and vegetation structures.

Extensive modification of historic and modern alluvial landforms within the sites is evident by the aerial extent of channel modifications resulting from historic mining and, more recently, impacts related to the TRD. A comprehensive discussion of these modifications is provided in the Trinity River Master EIR (Section 4.10, Cultural Resources). Table 6 provides a summary of the geomorphic features for the sites. These features are shown on Figure 6 for Douglas City and Figure 7 for Lorenz Gulch.

Table 6. Geomorphic Features within the Proposed Project Boundaries

GEOMORPHIC FEATURE	DOUGLAS CITY (ACRES)	LORENZ GULCH (ACRES)
Vegetated Riparian Berm*	1.476	2.268
Floodplain	12.425	2.008
Bedrock	0	0.175
Bar	0.468	0.860
Modified Terrace*	61.284	39.447
Upland Hillslope	14.931	12.761
Delta	0.500	0
Fill	0.516	0
Coarse Fill	4.077	0
Tailings	4.857	6.504
Unknown	27.610	10.155

* = Human induced geomorphic feature

The mainstem Trinity River flows generally southwest through the Douglas City site and north through the Lorenz Gulch site. The following description uses the river left or left bank and river right or right bank concept to describe the location of resources on each side of the river. River left and river right are defined from the standpoint of someone looking downstream.

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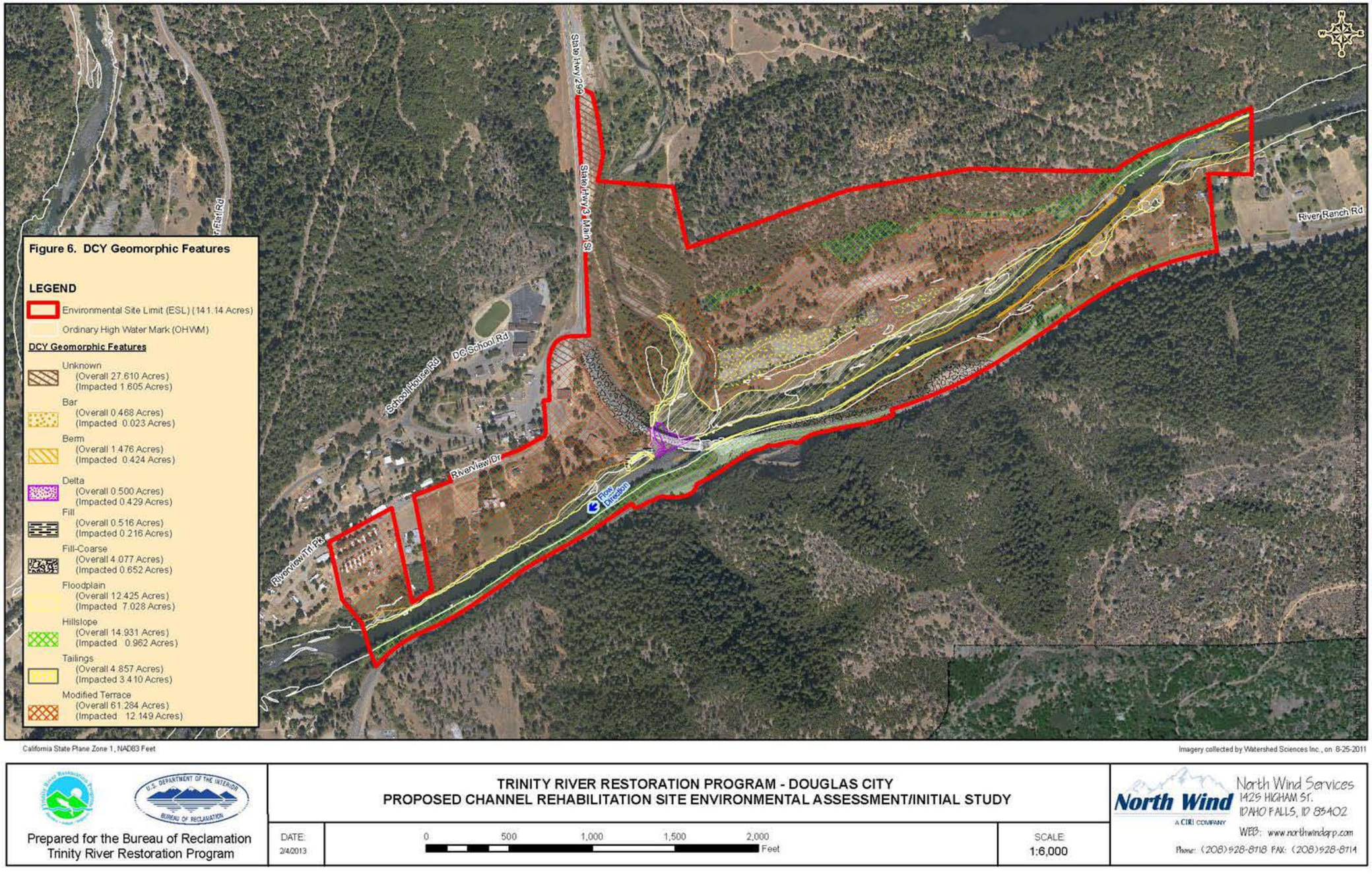

Figure 6. Geomorphic Features at the Douglas City Rehabilitation Site.

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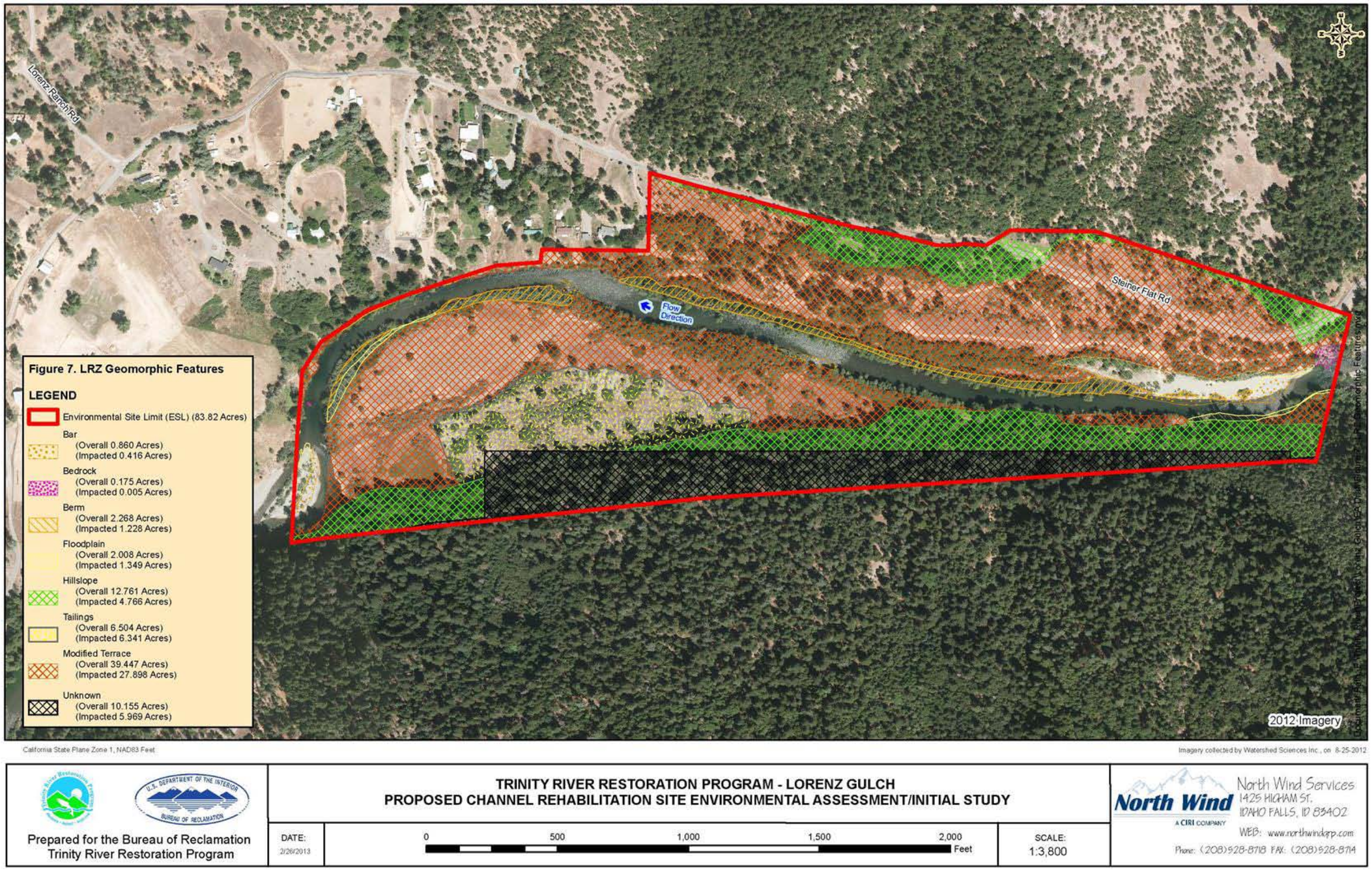

Figure 7. Geomorphic Features at the Lorenz Gulch Rehabilitation Site.

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The Douglas City site is located on the Trinity River between RM 93.6 and 94.6. The site is immediately adjacent to SR-299 and occupies the floodplain and alluvial terrace features on both sides of the Trinity River. Several commercial enterprises and numerous residential properties are present on the site. The hydrology of the site is influenced almost exclusively by the mainstem Trinity River and associated operation of the TRD (i.e., Lewiston Dam and Trinity Dam). To a lesser extent, development and runoff from adjacent roads and hillsides following precipitation also affect the site. Weaver Creek, an important tributary to the Trinity River, enters the river from the north just below the Douglas City Bridge. Indian Creek enters the river from the south, about a mile upstream of Weaver Creek. Both of these tributaries contribute substantial quantities of water, sediment, and organic material to the Trinity River.

Surficial deposits blanket the Douglas City Rehabilitation Site, and consist of recent and modern alluvial floodplain and terrace deposits and historic hydraulic and dredge tailings. Indian Creek provides a variety of alluvial materials that are stored in deltaic deposits at the confluence of the Trinity River. Weaver Creek also provides a reoccurring supply of alluvial material that influences the morphology of the Trinity River in the vicinity of the Douglas City Bridge. A review of historic aerial photographs between 1944 and 2009 show a dramatic decrease in bankfull channel width over this time period. Reduced flows from Trinity Dam operations combined with delta deposits from Weaver Creek narrowed the existing bankfull channel width of the downstream portion of the rehabilitation site from 250-300 feet down to its current bankfull width of between 110 and 120 feet. Safety of Dam releases, tributary floods, and ROD high flow releases have exacerbated the problem, depositing additional fine sediment along the right bank of the Project area and scouring the channel into its current rectangular form with near vertical banks. The mainstem channel surface substrate between RM 93.9 and RM 94.2 is gravel and cobble, while the channel between RM 93.5 and 93.9 is primarily cobble and boulders with many boulders exceeding 2 feet in diameter. The channel upstream of RM 94.2 is primarily gravel and cobble. A recent tributary event early in December of 2012 moved the Weaver Creek confluence with the Trinity River approximately 100 feet upstream, depositing a large right bank bar downstream (HVT et al. 2013).

Several constraints limit potential Douglas City Rehabilitation Site construction. Infrastructure constraints at the site include: the Douglas City Bridge located at RM 94 in the center of the Project reach; the Trinity County water pumping station and infiltration gallery located within the Trinity River channel and floodway between SR-299 and the mouth of Weaver Creek (approximately 160 feet downstream of SR-299); SR-3 runs along the entire left bank of the Trinity River downstream of the Douglas City Bridge; and homes and a trailer park are are located on the river right terrace in the downstream portion of the Project area, approximately 200 feet from the right edge water. In addition geological/physical constraints exist at the site including: valley wall and bedrock confinement along the left bank channel through part of the Project reach (RM 93.6-94.2); bedrock control, that limits vertical scour, at the downstream end of the site at approximately RM 93.51; the small size of the downstream portion of the Douglas City rehabilitation site provides little to no options for revegetation and terrace construction; and FEMA requires that the 100-year flood WSE at the site not be raised or lowered by more than 1 foot.

The Lorenz Gulch site covers approximately 0.8 miles of river. The site is located along Steiner Flat Road downstream of Douglas City and begins 22.0 miles downstream of Lewiston Dam. The downstream end of the site concludes 0.2 miles upstream of the Dutton Creek confluence. Flows at

the Lorenz Gulch site stem from releases out of the Trinity and Lewiston dams, combined with tributary accretion from approximately 300 square miles of drainage area from unregulated tributaries including Rush Creek, Grass Valley Creek, Indian Creek, Weaver Creek, and Reading Creek. Flows vary yearly, with summer months typified by a constant low baseflow from July through October, a period of low flow dam releases combined with surface runoff from November through April, and a period typified by high flow dam releases and surface runoff from April through June. The highest flows typically occur from dam releases combined with surface runoff and occur during the month of May.

All of the land within the Lorenz Gulch site is managed by the BLM, with some private landowners situated on the river right just east of the ESL at the northern (downstream) end of the site. The upper half of the Lorenz Gulch site is dominated by a steep hill slope and bedrock on river left, and a primitive boat access and gravel bar on river right. This gravel bar marks the beginning of a previously constructed side channel built in 1990. There is a large riparian berm that stretches 0.4 miles down the right bank beginning after the open bar at the top of the site. The previously constructed side channel is located just behind this berm. The side channel outlet is located just upstream of the first private landowners on river right. The lower mainstem portion of this site is dominated by bedrock on the right bank, and a large bedrock pool just upstream of the end of the ESL. The left bank through this section has valuable habitat in the form of woody debris and a heavily vegetated bank that slopes in towards the river. A major feature of the Lorenz Gulch site is a 2,300 foot long high terrace occurring on river left along the lower two thirds of the site. It averages six to 12 feet higher than the low flow WSE and also includes significant sections of mine tailings reaching 20 feet above the nearby WSE.

3.3.1.2 Mineral Resources

The geologic properties of many of the units in the Klamath Mountains Province (KMP) are related to their origins as oceanic crust and/or their intrusion by plutonic bodies. These properties have resulted in mineralization that is widely distributed. Many minerals of economic importance are present, including gold, copper, zinc, chromite, manganese, platinum, silver, and mercury. These minerals have been mined from the advent of European settlement to the present by a variety of methods.

Historically, the principal mineral of economic importance was gold. Both lode (hardrock) mines and placer (alluvial gravel) mines were present in the watershed with activity from 1848 to the present. The tailing deposits associated with large-scale placer mining provide a substantial source of aggregate required in various construction projects. Since World War II, mineral extraction activities have focused on aggregate resources. Presently there is a moratorium on suction dredging (Fish & Wildlife Code, § 5653 subd. (d)), although some gold mining activity continues in the form of panning and other non-motorized techniques. Placer mining has left tailing deposits that are apparent at the rehabilitation sites and that continue to influence the form and function of the Trinity River. Over time, aggregate mining of alluvial deposits and reworking of hydraulic tailings have resulted in additional channel modifications and changes in sediment supply.

The General Mining Law of 1872 is one of the major statutes that direct the federal government's land management policy. The law grants free access to individuals and corporations to prospect for minerals in public domain lands and allows them, upon making a discovery, to stake (or "locate") a

claim on that deposit. Sections of the Trinity River that are under federal jurisdiction are therefore open to prospecting. There are 36 named active mining claims (USDI BLM 2008) associated with the Trinity River in the 40-mile reach below Lewiston Dam. BLM records identify most of these claims as placer claims. Placer claims are established with the intent to sort unconsolidated alluvial materials for precious metals (e.g., gold, platinum). Currently, there are no authorized Plan of Operations for placer mining activities within or in close proximity to any TRRP rehabilitation sites; however, there are two mining claims at the Douglas City site and one mining claim at the Lorenz Gulch site where casual mining may occur. While suction dredging has been the principal mining method used on the Trinity River, there is currently a moratorium on suction dredging throughout California. The CDFW is currently prohibited by statute from issuing suction dredge permits (Fish & Wildlife Code, § 5653.1, subd. (a)), and the CDFW cannot currently predict when, or if, suction dredging will be lawful in California in the future or when permits may be available to interested miners.

Other than mining activities authorized under the Surface Mining and Reclamation Act (SMARA), information on private mining activities in Trinity County is limited. According to records provided by BLM and Trinity County, there are currently no approved mining activities operating under the provisions of the 1872 mining law or a county SMARA permit within, or in close proximity to, the Proposed Project sites. There are, however, two active mining operations in the region that operate under a County SMARA permit, the Eagle Rock Mine and the Smith Mine. The Eagle Rock Mine, a sand and gravel extraction company, is currently operating at the site of the historic La Grange Hydraulic Gold Mine upstream of Junction City. The Smith Mine is active on an intermittent basis based on market conditions.

The Proposed Project sites have been heavily disturbed by previous mining activities. Large-scale hydraulic mining was conducted at various locations near the Douglas City site, including the Union Hill Pond hydraulic pit located north of the ESL on river right. The hydraulic mining operations used high water pressure to erode and mobilize large quantities of unconsolidated overburden from gold-bearing areas. Evidence of this activity (e.g., exposed banks and erosional features) can be seen from the banks of the Trinity River north of the site boundary. Large-scale bucket-line dredge operations were also common between 1930 and 1950. These activities resulted in tailing deposits that can be observed along the right bank of the Trinity River within the vicinity of the Douglas City site. In addition, tailings piles were processed and utilized upriver as coarse sediment by TRRP contractors during construction of the Indian Creek Channel Rehabilitation Project in 2007. The current Douglas City ESL includes areas where tailings piles were removed.

The Lorenz Gulch site contains a concentration of dragline dredge tailings as well as a remnant of a historic hydraulic mining landscape. Due to the nature of hydraulic mining, which involves a massive amount of water flowing down destabilized slopes, natural erosional processes have resulted in the site consisting mainly as an array of discontinuous remnants.

TRRP is working closely with BLM to ensure that construction efforts are consistent with BLM's long-term management goals for the sites, where mining claims presently exist.

3.3.1.3 Geologic Hazards

A discussion of the regional seismicity and seismic hazards is provided in the Trinity River Master EIR (Section 4.3). No local active Quaternary faults have been identified, although little detailed

mapping of Quaternary geologic features has been conducted in the area. The soils bordering the Trinity River are predominantly alluvial in nature and have the potential to experience liquefaction – a process whereby water-saturated granular soils are transformed to a liquid state during ground shaking; however, the type of activities described in Chapter 2 would not affect the potential for liquefaction or be affected by liquefaction were it to occur.

3.3.1.4 Soils

The soils at the Proposed Project sites are described in the Soil Survey of Trinity County, California, Weaverville Area (USDA 1998). There are six main soil types in the Douglas City Project area. They are 102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes; 114 – Brownscreek gravelly loam, 50 to 75 percent slopes; 147 – Haploxerolls, warm, 0 to 2 percent slopes; 152 – Haysum Gravelly Loam, 5 to 9 percent slopes; 213 – Xeralfs-Xerorthents Complex, 5 to 50 percent slopes; and 217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes. There are four main soil types at the Lorenz Gulch Rehabilitation Site. They are 102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes; 112 – Brownbear-Bamtuch Complex, 30 to 50 percent slopes; 158 – Hoosimbim-Etsel Complex, 30 to 50 percent slopes; and 217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes. Brief descriptions of these are included below.

102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes. This map unit is on alluvial fans, stream terraces, and floodplains that have been altered by dredging operations. This unit is about 50 percent Atter extremely gravelly loamy sand, 20 percent Dumps, dredge tailings, and 15 percent Xerofluvents. The Atter soil is very deep and is somewhat excessively drained. Permeability is rapid in the Atter soil. Available water capacity is very low. Runoff is slow, and the hazard of water erosion is slight. Dumps and dredge tailings consist of nearly barren mounds deposited along stream channels by dredge mining activities. Permeability is rapid in areas of the dumps. Runoff is medium, and the hazard of water erosion is slight. Xerofluvents consist of well-drained soils that formed in alluvium derived from mixed rock sources. Permeability is moderate or rapid in the Xerofluvents. Available water capacity is very low or low. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. These soils are subject to flooding during prolonged, high-intensity storms. The frequency of the flooding ranges from rare to frequent; channeling and deposition are common along streambanks (USDA 1998).

112 – Brownbear-Bamtush Complex, 30 to 50 percent slopes. This map unit is located on mountains. The unit is 50 percent Brownbear soils and 30 percent Bamtush soils. The Brownbear soil is moderately deep and well drained. The Bamtush soil is very deep and well drained. For both Brownbear and Bamtush soils, permeability is moderate, available water capacity is low, and runoff is rapid. This unit also includes about 20 percent minor components. This soil map unit is on the hillslope above the river and floodplain and is not subject to flooding (USDA 1998).

114 – Brownscreek gravelly loam, 50 to 75 percent slopes. This map unit is located on mountains. Typically, 35 to 40 percent of the surface is partially covered with gravel and some cobbles and with a one-inch mat of leaves and needles mixed with gravel. Included with this soil in mapping are areas of Dedrick very gravelley loam under grass and hardwoods and areas of Dougcity gravelly loam and Sheetiron very gravelly loam under conifers; areas make up about 20 percent of the total acreage, but varies by area. Permeability is moderate in the Brownscreek soil. Available water capacity is low. Runoff is rapid, and the hazard of water erosion is severe (USDA 1998).

147 – Haploxerolls, warm, 0 to 2 percent slopes. This map unit is located on stream terraces. These soils formed in alluvium derived from mixed rock sources. Areas are adjacent to perennial streams. Within this map unit occurs small areas of Xerofluvents and Riverwash along stream channels under woody streamside vegetation, such as willow and alder; Haysum gravelly loam, 2 to 5 percent slopes; and Carrcreek gravelly loam, 2 to 5 percent slopes. Permeability is moderately rapid or rapid. Available water capacity is low or moderate. Runoff is slow and the hazard of water erosion is slight (USDA 1998).

152 – Haysum gravelly loam, 5 to 9 percent slopes. This very deep, well-drained soil is on alluvial fans. Included with this soil are small areas of Xerofluvent and riverwash. Permeability is moderately high to high, available water capacity is very high, and runoff is moderate. This soil is found on benches above the river and floodplain and is not likely to flood (USDA 1998).

158 – Hoosimbim-Etsel complex, 30 to 50 percent slopes. This map unit is located on mountain slopes. This unit is about 45 percent Hoosimbim soils, 35 percent Etsel soils, and 20 percent minor components. The Hoosimbim soil is deep and well drained. Permeability is moderately high to high in the Hoosimbim soil. Available water capacity is very low. The Etsel soil is very shallow and somewhat excessively drained. Permeability is moderately high to high in the Etsel soil. Available water capacity is very low. This soil map unit is on the hillslope above the river and floodplain and is not subject to flooding (USDA 1998).

213 – Xeralfs-Xerorthents Complex, 5 to 50 percent slopes. This map unit is located on hills and terraces. Much of the soil has been removed by hydraulic mining. Areas are dissected by perennial streams. This unit is about 40 percent Xeralfs and 40 percent Xerorthents. The Xeralfs consist of well-drained soils of variable depths. Permeability is very slow to moderate in the Xeralfs. Available water capacity is very low to moderate, and runoff is rapid. The Xerorthents consist of well-drained soils of variable depths. Permeability is slow or moderate in the Xerorthents. Available water capacity is very low or low, and runoff is very rapid. This soil map unit is on the terrace above the river and floodplain and is not subject to flooding (USDA 1998).

217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes. This map unit is located on floodplains and stream terraces. It formed in alluvium derived from mixed rock sources. This unit is about 45 percent Xerofluvents and 35 percent Riverwash. Varying areas of the stream channel occur within this map unit that are under water during parts of the year. Xerofluvents consist of well-drained soils that formed in alluvium from mixed rock sources. Permeability is moderate to rapid in the Xerofluvents. Available water capacity is very low or low, and runoff is slow or medium. These soils are subject to flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. Riverwash consists of nearly barren, unstabilized, stratified sandy, silty, clayey, stony, cobbly, or gravelly alluvium derived from mixed rock sources. Areas of Riverwash are flooded, channeled, and reworked nearly every winter (USDA 1998).

3.3.2 Environmental Consequences/Impacts and Mitigation Measures

3.3.2.1 Methodology

Data for the following analysis were taken from existing reports on regional and local geology as well as on-site assessments during field reviews. These reports include the following documents: Geology of Northern California (USGS 1966); Soil Survey of Trinity County, California, Weaverville

Area (USDA 1998); wetland delineations (North Wind 2011); Trinity River Mainstem Fisheries Restoration Program EIS; Trinity River Maintenance Flow Study Final Report (McBain and Trush 1997); Trinity County General Plan; and previously cited online and Geographic Information Systems (GIS) data sources.

3.3.2.2 Criteria for Determining Significance

A project would have a significant impact related to geology, geomorphology, soils, and minerals if it could subject people, structures, or other resources to geologic or seismic hazards or disrupt, eliminate, or otherwise render geologic, soil, or mineral resources unusable or unavailable. Significant impacts would occur if the Project would:

- Expose people, structures, or critical utility facilities to major geologic hazards (including seismicity, landslides, seiches, and liquefaction);
- Involve changes in topography that would result in unstable soil conditions;
- Increase erosion rates to a level at which associated sedimentation levels could affect streams, rivers, or other water bodies;
- Interfere with existing, proposed, or potential development of mineral resources; or
- Be inconsistent with the 10 Trinity River healthy alluvial river attributes.

3.3.2.3 Impacts and Mitigation Measures

Table 7 summarizes the potential geology, fluvial geomorphology, minerals and soils impacts that would result from the No-Project and Proposed Project alternatives.

Table 7. Summary of Geology, Fluvial Geomorphology, Soils, and Minerals Impacts for the No-Project and Proposed Project Alternatives

NO-PROJECT ALTERNATIVE	PROPOSED PROJECT	PROPOSED PROJECT WITH MITIGATION
Impact 3.3-1. Implementation of the Proposed Project could result in the exposure of structures and people to geologic hazards, including ground shaking and liquefaction.		
No impact	No impact	Not applicable[1]
Impact 3.3-2. Construction activities associated with the Proposed Project could result in increased erosion and short-term sedimentation of the Trinity River.		
No impact	Significant	Less than significant
Impact 3.3-3. Implementation of the Proposed Project would interfere with existing, proposed, or potential development of mineral resources.		
No impact	Significant	Less than significant

[1] Because this potential impact is less than significant, no mitigation is required.

Impact 3.3-1: Implementation of the Proposed Project could result in the exposure of structures and/or people to geologic hazards, including ground shaking and liquefaction.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no construction activities would occur. There would be no new exposure of structures and/or people to geologic hazards. Therefore, there would be no impact.

PROPOSED PROJECT

Under the Proposed Project, no permanent structures or facilities would be constructed. There would be no new exposure of structures and/or people to geologic hazards. Thus, there would be no impact.

Impact 3.3-2: Construction activities associated with the Proposed Project could result in increased erosion and short-term sedimentation of the Trinity River.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, the Project would not be constructed. Therefore, no construction-related erosion or associated sedimentation of the Trinity River would occur, and there would be no impact.

PROPOSED PROJECT

Implementation of the Proposed Project has a significant potential to increase erosion and subsequent short-term sedimentation of the Trinity River. The significance of erosion at each site would likely be influenced by the following:

- The extent that disturbed soils are exposed to flowing water;
- The extent that disturbed soils are exposed to energetic weather conditions; and
- The extent of soil compaction and associated runoff.

During or after excavation and other related construction activities, the highest rate of soil erosion would most likely occur near the margins of constructed features (e.g., side channels, alcoves, and floodplains). At these locations, the exposure of fine-textured soils during and after construction would increase the potential for soil erosion and sedimentation. Impacts of turbidity levels specific to water quality degradation are analyzed below, in Section 3.5, Water Quality, and associated impacts to anadromous fisheries are analyzed in Section 3.6, Fishery Resources.

A large portion of proposed rehabilitation activities would occur in proximity to flowing water and could expose newly disturbed and/or stable sediments and other alluvial materials to flowing water. Specifically, in-channel activities would likely disturb areas in proximity to flowing water. Riverine work areas may generally be isolated so that flowing water does not reach these areas until they are "opened" to the river. Sediment exposed to flowing water has an increased potential to mobilize and be transported downstream resulting in impacts such as short-term increases in surficial and channel erosional processes; increases in turbidity levels downstream (varying distances); and changes to type, volume, and character of deposition downstream. Monitoring results from previous TRRP channel rehabilitation projects (i.e., Hocker Flat, Canyon Creek, Indian Creek, and Lewiston-Dark Gulch) demonstrate that these impacts decrease rapidly once construction activities have ceased. However, downstream turbidity levels may remain elevated for a longer duration post-construction when winter high flows wash over newly disturbed areas and seasonal fluctuations in hydrologic conditions further shape the disrupted area into a more stable geometry.

Construction activities in the river and the uplands have the potential to significantly decrease soil cohesion and armoring, thus increasing soil exposure to energetic weather conditions and increasing the short-term potential for wind and water erosion. Increased wind and water erosion and subsequent downstream sediment transport in the Trinity River would occur if any soils were left exposed during the wet season (typically November through May) as well as other infrequent precipitation events (summer thunderstorms).

The use of heavy equipment for restoration activities would likely increase soil compaction; potentially causing surface water runoff. An increase in the volume of surface water runoff

increases the potential for erosion. Thus, any significant increase in soil compaction would cause a potentially significant increase in erosion. Therefore, this impact is significant.

MITIGATION MEASURES

Construction activities associated with the Project could result in increased erosion and short-term sedimentation of the Trinity River. Therefore, mitigation measures 4.3-2a and 4.3-2b described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.3-3: Implementation of the Proposed Project would interfere with existing, proposed, or potential development of mineral resources.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, the Project would not be constructed. Therefore, no interference with existing, proposed, or potential development of mineral resources would occur, and there would be no impact.

PROPOSED PROJECT

Trinity County was historically a gold mining region, and many unpatented mining claims exist along the Trinity River. A map of 2009 active mining claims is provided in the Trinity River Master EIR (Regional Water Board and Reclamation 2009). The development of mineral resources may be inhibited if a mining claim occupies a rehabilitation site. At these sites, mining would likely be precluded during construction for safety reasons. Post-construction, fishery habitat improvements and riparian plantings would either preclude mining that would negatively impact rehabilitation site habitat improvements, or if mining were to be permitted in the rehabilitation areas, reclamation to habitat rehabilitation standards would be required as a permit condition. Overall, the Proposed Project could inhibit the development and extraction of mineral resources, including precious metals and aggregate resources within, and close to, the Proposed Project sites. Channel rehabilitation activities could inhibit the development of mineral resources on mining claims or private lands and would be a significant impact if such activities occurred or were planned for the stretches of the river near the Proposed Project sites.

There are two current aggregate mining activities operating through a County SMARA permit, the Eagle Rock and Smith mines. The Eagle Rock Mine is not located within hydrologic influence of the Trinity River and would not likely be affected by the Proposed Project. The Smith Mine is located within the boundary of the completed Hocker Flat Rehabilitation Site and continues to operate intermittently following completion of the Hocker Flat Project. Additionally, there are at least 36 named mining claims along the Trinity River on public lands managed by BLM. Currently, BLM has no authorized operating plans for mines along this reach of the Trinity River. There are two active claims at the Douglas City site and one active claim at the Lorenz Gulch site. One of the claims at the Douglas City site and the claim at the Lorenz Gulch site is located on lands withdrawn for powersite purposes; hence the claims are subject to BLM review under Public Law 359, Mining in Powersite Withdrawals Act of 1955. BLM has determined that placer mining operations on these claims would substantially interfere with the restoration Project and that mining operations should not be allowed within the boundaries of the restoration Project. In addition, certain recreational mineral specimen collecting activities (43 CFR 8365.1-5), such as sluicing, should not be allowed in

portions of the restoration sites. Therefore the Project would have potentially significant impacts on the potential development of mineral resources at that site. This would be a significant impact.

The Project could adversely affect mineral claimants or recreational miners by reducing potential flexibility for mining exploration and development. Future consequences to mineral claimants or recreational miners could entail increased reclamation costs, decreased land available for mining or dredging, reduced flexibility in developing exploration and mine plans, and diminished access to mineral claims. Project construction activities associated with the Proposed Project that occur in the river could temporarily or permanently preclude individuals from accessing and actively working their mining claims.

The TRRP and BLM would work closely with the mining community to address concerns related to mining once the Project is completed. Mineral claimants that may be affected by the restoration efforts would be contacted to discuss future mining plans and options to reduce Project impacts to these plans.

Though some of the mining claims at the Proposed Project sites fall within a powersite, the improvement of fish and wildlife habitat falls within the parameters of a federal agency's authority to manage "other surface resources" on unpatented mining claims granted by the Surface Resources Act, 30 U.S.C. § 612(b) (1994). Two Interior Board of Land Appeals (IBLA) decisions are referenced that support this authority. IBLA 87-340, July 13, 1989, states that the locator of an unpatented mining claim subject to the Act may not interfere with the right of the United States to manage the vegetative and other surface resources of the land, or prevent agents of the federal government from crossing the locator's claim in order to reach adjacent land for purposes of managing wild-game habitat or improving fishing streams so as to thwart the public harvest and proper management of fish and game resources on the public lands generally, both on located and on adjacent lands. IBLA 92-531 and 92-532, October 7, 1997, states that an agency's right to manage the surface resources on unpatented mining claims is not confined to simply preserving those resources as they exist, but also embraces enhancing those resources. Accordingly, fish habitat enhancement techniques fall within an agency's authority to manage "other surface resources" on unpatented mining claims.

MITIGATION MEASURES

Implementation of the Project could interfere with existing, proposed, or potential development of mineral resources. Therefore, mitigation measures 4.3-3a, 4.3-3b, and 4.3-3c described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant. In general, mining that requires a Plan of Operation would not be allowed on the claims within the area of the Project boundaries.

3.4 Water Resources

This section presents a discussion of the water resources known to occur in the Trinity River Basin in proximity to the Proposed Project sites. It evaluates potential impacts to water resources from implementation of the Proposed Project. Additional information about the affected environment for water resources is addressed in the Trinity River Master EIR (Section 4.4).

3.4.1 Affected Environment/Environmental Setting

3.4.1.1 Surface Water Hydrology

The Trinity River Basin encompasses approximately 2,965 square miles, about one-quarter of which is upstream of the TRD. Since 1960, the TRD has been the major determinant of the hydrologic conditions affecting the mainstem Trinity River, particularly in the 40-mile reach downstream of Lewiston Dam. Figure 1 shows the locations of the proposed rehabilitation sites along the Trinity River.

Prior to authorization of the 2000 ROD for the Trinity River Mainstem Fishery Restoration EIS, the average annual flow volumes released from the TRD into the Trinity River at Lewiston Dam were reduced from pre-dam conditions by as much as 90 percent. Consequently, channel form and function in this reach have been substantially altered. From 1962 to 1979, CVP diversions delivered nearly 90 percent of the water from the TRD to the Sacramento River for urban and agricultural use[6]. After 1979, river releases were increased from 110,000 to 340,000 afa, substantially increasing the available flow to the Trinity River during the period between 1979 and 2002 (ROD flows). Although the 2000 ROD for the Trinity River FEIS/EIR established an annual volume based on water year types, litigation in federal court prevented implementation of the flow releases specified in the ROD in water years 2001-2004. Ultimately, the ROD was upheld, and the 2005 water year incorporated the schedule established by the TRRP in accordance with the ROD. This schedule is revised each year based on water year type.

3.4.1.2 Groundwater

Most usable groundwater in the mountainous Trinity River Basin occurs in widely scattered alluvium-filled valleys, such as those immediately adjacent to the Trinity River. These valleys contain only small quantities of recoverable groundwater and are therefore not considered a major source. A number of shallow wells adjacent to the river provide water for domestic purposes. These infiltration wells are often located near the river and may be affected by spring ROD flow releases (i.e., up to 11,000 cfs). Consequently, the TRRP in cooperation with Trinity County has implemented the Trinity River Potable Water and Sewage Disposal System Assistance Program (Assistance Program) to allow qualifying landowners to relocate, replace, modify, or otherwise improve their potable water and sewage systems to better resist damage from ROD flows intended to benefit fisheries. The Assistance Program is a one-time only opportunity to receive financial assistance from the TRRP to ensure that ROD flows do not negatively affect existing infrastructure and site improvements (e.g., water sources and wastewater disposal systems). At the time the Trinity River Master EIR was completed, approximately 75 wells/septic systems had been improved and another 40 were planned for enhancement with TRRP funding. Additionally, there are a number of wells that are designed to be inundated, and often are, during the course of a water year.

3.4.1.3 Floodplain Hydrology and Hydraulics

The floodplain of the Trinity River is identified in FEMA's Flood Insurance Study, Trinity County, California, and Incorporated Areas (1996). Actual floodplain designations are contained in the accompanying Flood Insurance Rate Map (FIRM). The countywide FIRM became effective on August 16, 1988, with an update in 1996.

[6] The percentage of the Trinity River diverted to the CVP is the percentage of total reservoir release, not the percentage of the inflow.

Within the 40-mile reach of the Trinity River below Lewiston Dam, the river has adjusted to a flow and sediment regime imposed in large part by the TRD. While the degree of berm development varies within the 40-mile reach, the river channel has been simplified and the channel has narrowed over time. In general, the aquatic habitat in this reach of the river lacks complexity and is typified by a recurring sequence of pools, runs, glides, and low-slope riffle habitat. Though the annual hydrograph is influenced by accretion flow from tributaries, the main influence on river flows is the Lewiston Dam release. The closer to the dam, the greater its relative influence on river flows. In the vicinity of the dam (downstream to approximately Weaver Creek), the OHWM is equal to the normal year ROD flow release of 6,000 cfs. Downstream of Weaver Creek, winter flows have the dominant influence on the OHWM. Winter peak flows here frequently exceed spring ROD releases. The OHWM in the Canyon Creek area was estimated at 6,600 cfs (Regional Water Board and Reclamation 2006). For this document, the OHWM was field verified during the wetland delineation and that value is represented on all figures. The verified OHWM was at an elevation greater than the modeled 6,600 cfs line. The timing of peak flow and ramping-down releases under the ROD corresponds to the typical annual period of peak snowmelt floods in the watershed for each of the water year classes described in the ROD. Additional information on morphologic processes and Trinity River flows is provided in Sections 4.3 and 4.4, respectively, of the Trinity River Master EIR.

The best available hydraulic analysis for the Trinity River is the Trinity River Hydraulic Flow Study: North Fork Trinity to Lewiston Dam developed by the California DWR for the TRRP using flow data from the 2005 Reclamation study (California DWR 2007). The California DWR study summarizes flow modeling of the mainstem Trinity River from Lewiston Dam to its confluence with the North Fork Trinity River, 40 miles downstream. The model estimates WSE based on a controlled flow release of 11,000 cfs from Lewiston Reservoir with 10-year and 100-year spring tributary flows. The TRRP has defined the 11,000 cfs release plus 100-year spring tributary flow event as the MFF for Project planning and risk assessment purposes. Using the well grant assistance program, the TRRP has funded the structural improvement and relocation (or otherwise addressed problems with existing structures) within the MFF inundation zone to allow this maximum ROD flow to be implemented.

3.4.2 Environmental Consequences/Impacts and Mitigation Measures

3.4.2.1 Methodology

Hydraulic models allow the preliminary evaluation of risks to Trinity River properties by comparing the WSE of the Proposed Project sites' design conditions with the existing conditions. The comparison indicates how the features of the Proposed Project sites could affect the BFE estimated by FEMA for the 100-year flood. One of the design criteria for the Proposed Project was developed to ensure that none of the proposed activities would result in an obstruction to flow or an increase in the BFE of more than 12 inches.

3.4.2.2 Significance Criteria

The Proposed Project would have a significant impact related to water resources if one of the following conditions occurred:

- It could subject people, structures, or other resources to substantial changes in flood hazards; or
- It would result in modification of groundwater resources.

The Proposed Project would result in a significant impact related to hydraulics if one of the following conditions occurred:

- The base flood WSE would increase by more than 1 foot;
- There would be a substantial alteration of the existing drainage pattern of a site or area, including the alteration of the course of a stream or river, or a substantial increase in the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; or
- It would expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

The Proposed Project would result in a significant impact to groundwater if one of the following conditions occurred:

- There would be a long-term decline in groundwater elevations (or a net reduction in groundwater storage) due to interference with recharge;
- There would be detectable land subsidence;
- Any water quality standards or waste discharge requirements intended to protect groundwater quality would be violated; or
- There would be a detectable degradation of groundwater quality.

Groundwater impacts were assessed at the scale of a groundwater basin or sub-basin. The significance of declining (or increasing) water levels depends in part on the duration and permanence of the impact. Because groundwater elevations fluctuate naturally due to changes in rainfall, short-term changes in groundwater elevations are not considered significant impacts.

3.4.2.3 Impacts and Mitigation Measures

Table 8 summarizes the potential water resources impacts that would result from the No-Project and Proposed Project alternatives.

Table 8. Summary of Potential Water Resource Impacts for the No-Project and Proposed Project Alternatives

NO-PROJECT ALTERNATIVE	PROPOSED PROJECT	PROPOSED PROJECT WITH MITIGATION
Impact 3.4-1. Implementation of the project could result in a temporary or permanent increase in the BFE.		
No impact	Less than significant	Not applicable[1]
Impact 3.4-2. Implementation of the project could result in a permanent decline in groundwater elevations or a permanent change in groundwater quality.		
No impact	Less than significant	Not applicable[1]
Impact 3.4-3. Implementation of the project would expose people or structures to a significant risk of injury, death, or loss involving flooding or erosional processes.		
No impact	Less than significant	Not applicable[1]

[1] Because this potential impact is less than significant, no mitigation is required

Impact 3.4-1: Implementation of the Proposed Project could result in a temporary or permanent increase in the base floodwater elevation.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, the Trinity River floodplain would not be altered and the existing BFE would not change because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

The elevation and extent of the floodplain of the Trinity River would be modified through the activities associated with the Proposed Project, as described in Chapter 2. The Proposed Project would be consistent with the overall Project objectives and design criteria established by the TRRP and the Regional Water Board and the hydraulics analysis indicates that removing all the excavated material from the riverine rehabilitation areas and placing it as coarse sediment within the channel or above the BFE in upland activity areas would not result in an increase in the FEMA BFE. Therefore, the impact would be less than significant.

Impact 3.4-2: Implementation of the Proposed Project could result in a permanent decline in groundwater elevations or permanent changes in groundwater quality.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no effects on local groundwater levels would occur because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

The displacement of channel and floodplain materials has only a minimal potential to change the groundwater hydraulics within the boundaries of the Proposed Project sites. Groundwater table elevations and water volumes in nearby off-channel wetlands would not be affected because groundwater elevations in these areas are associated with river stage. The tendency of the surface water-groundwater system to move to equilibrium conditions and the overall absence of impacts to the regional driving mechanisms of groundwater recharge (seasonal precipitation and Trinity River flow regimes) suggest that no long-term impacts on water table elevations would occur. Therefore, this impact would be less than significant.

Impact 3.4-3: Implementation of the Proposed Project would expose people or structures to a significant risk of injury, death, or loss involving flooding or erosional processes.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no people or structures would be exposed to additional flood risks because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

The Proposed Project would not result in activities intended to increase the BFE at the rehabilitation sites. Activities intended to modify the bed and banks of the Trinity River could have ancillary impacts to the bed and banks downstream. To date, the TRRP staff has identified several locations downstream of activity areas where the bank of the river appears to be responding to post-ROD changes in the flow and sediment regime.

While the fundamental objective of the activities associated with the Proposed Project is to reestablish the alluvial features of the river, isolated instances of bank erosion may result in the loss of river bank and associated vegetation or, to a lesser extent, constructed features such as wells, utilities, and landscape features. In addition to the Assistance Program for water and sewer, bank stabilization measures, specifically the bio-engineering measures described in Appendix A, are intended to address these impacts on a case-by-case basis, consistent with all federal, state, and local requirements. In concert with the ongoing TRRP and the activities described in Chapter 2 and Appendix A, the Proposed Project is designed to avoid exposing people or structures to a significant risk of injury, death, or loss involving flooding. Therefore, this impact would be less than significant.

3.5 Water Quality

This section describes water quality conditions in the vicinity of the Proposed Project sites along the Trinity River. It also evaluates potential impacts to water quality from implementation of the Proposed Project. The principal components of the TRD are Lewiston Dam, Trinity Dam, and the facilities that divert runoff from the Trinity River watershed to the Sacramento River Basin. Prior to full implementation of the ROD, up to 90 percent of the natural Trinity River flow was diverted, which substantially altered water quality in the Trinity River, particularly its temperature and sediment regimes. Additional information on the affected environment as it relates to water quality is provided in the Trinity River Master EIR, Section 4.5, Water Quality. Information related to this topic is also provided in the Trinity River Master EIR in Section 4.4, Water Resources, and Section 4.6, Fisheries.

3.5.1 Affected Environment/Environmental Setting

The releases from the TRD influence flow volumes and velocities, water quality, and channel geometry downstream of Lewiston Dam. These influences are particularly important to water quality parameters such as temperature, turbidity, and suspended sediments. A dramatic decrease in the abundance of Trinity River coldwater fishes has taken place since the TRD began operation (USFWS and HVT 1999). Water quality in the Trinity River may also be affected by acid mine drainage from abandoned mines and past mining activities, sediment releases from land use practices associated with unstable soils and decomposed granite (e.g., roads, vegetation management, and subdivisions), septic tanks, aboveground and underground storage tanks, and lumber mills (Regional Water Board 2011).

The Proposed Project is subject to compliance with the Water Quality Control Plan for the North Coast Region (Basin Plan; Regional Water Board 2011). The beneficial uses for the Trinity River defined in the Basin Plan are listed in Table 4.5-1 of the Trinity River Master EIR. In addition to municipal and domestic water supply, the beneficial uses affected by the water quality of the Trinity River are primarily those associated with supporting high-quality habitat for fish. Recreation (contact and non-contact) is another important beneficial use potentially affected by various water quality parameters (e.g., sediment and temperature). The Basin Plan identifies both numeric and narrative water quality objectives for the Trinity River. Table 4.5-2 in the Trinity River Master EIR summarizes the water quality objectives for each of the categories that have been established by the Regional Water Board to protect designated beneficial uses.

Temperature

The influence of Trinity Lake and Lewiston Reservoir on downstream conditions diminishes with distance. In general, the greater the release volumes from Lewiston Dam, the less susceptible the river's temperature is to other factors. Releases from the TRD are generally cold (42° to 47° F). These temperatures are transmitted through Lewiston Reservoir to the Trinity River below Lewiston Dam.

Sediment

In 1992, the Environmental Protection Agency (EPA) added the Trinity River to its list of impaired rivers under the provisions of Section 303(d) of the Clean Water Act (CWA) in response to a determination by the State of California that the water quality standards for the river were not being met due to excessive sediment. In 2001, the EPA established a Total Maximum Daily Load for sediment in the river. The Regional Water Board has continued to identify the Trinity River as impaired in subsequent listing cycles. The primary adverse impacts associated with excessive sediment in the Trinity River pertain to degradation of habitat for anadromous salmonids. The restriction of streamflows downstream of the TRD has greatly contributed to the impairment of the Trinity River below Lewiston Dam (EPA 2001). With implementation of ROD flows and placement of coarse sediment in the Lewiston area, local reductions in fine sediment in the river bed have been observed and fish spawning has increased. Recent measurements to compare in-channel fine sediment concentrations pre- and post-ROD flows have indicated that gravel quality and river bed oxygen permeability have increased through the 40-mile reach. The percent fines measured in Trinity River samples at 2001 sites revisited in 2010, was measurably less than found in 2001 (Graham Matthews and Associates 2010).

Local fishermen (e.g., the TRGA) have recently expressed concern that TRRP addition of gravel to the river has resulted in the filling, or partial filling, of fishing holes (adult holding habitat) with gravel. In high flow gravel augmentation areas, primarily Sawmill and Lowden locations, holes have decreased in depth. Furthermore, due to high fishery flows released in spring 2011 (11,000 cfs from Lewiston Dam), riverbed and floodplain gravel have also moved more than in earlier years. While increased erosion and gravel movement during high flow years is to be expected, the TRRP has examined data, collected pre- and post-high flows, to determine the extent and type of change that has occurred on the river's bottom, and a draft summary is in process. The results, in combination with Phase I reporting, will assist the TRRP in determining how to proceed with future gravel augmentation at rehabilitation sites and during high flow augmentation efforts.

Turbidity

The Basin Plan (Regional Water Board 2011) contains water quality objectives to protect present and probable future beneficial uses of water and to protect existing high quality waters of the state. Water quality objectives form the basis for establishment of waste discharge permits. The Basin Plan contains a water quality objective for turbidity that applies to the Trinity River, including the Proposed Project sites. The water quality objective for turbidity states, "Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon issuance of discharge permits or waiver thereof." An allowable zone of turbidity dilution is an area within water where turbidity discharges may increase the naturally occurring turbidity level by more than 20 percent. An allowable zone of turbidity dilution may only be granted in

waste discharge permits if all beneficial uses (identified in Table 4.5-1 of the Trinity River Master EIR) remain protected.

The turbidity level in a water body is related to the concentration of suspended solids, which are predominantly less than 0.5 millimeter (mm) in diameter. Water clarity has historically been measured as the concentration of suspended solids (mg/L) or more recently as turbidity, which is measured in NTUs. Turbidity generally does not cause acute adverse effects to aquatic organisms unless concentrations are extremely high (Lloyd 1985). Noggle (1978) estimated an acute lethal concentration causing 50 percent mortality of juvenile coho salmon at 1,200 mg per liter (mg/L) during summer (approximately 900 NTU). At relatively high levels, suspended solids can adversely affect the physiology and behavior of aquatic organisms and may suppress photosynthetic activity at the base of food webs, affecting aquatic organisms either directly (e.g., ability to feed) or indirectly (e.g., impact to food supply or spawning substrate) (Alabaster and Lloyd 1980). However, at lower levels, effects of turbidity last as long as the perturbation in clarity and are limited to reducing reactive distance to prey as well as predation risk. For instance, if periods of increased turbidity occur during periods of merganser (fish predator) activity, the turbidity would probably be used as protective cover that would provide an overall benefit to the fish (Regional Water Board 2009). In the lab, benthic feeding success of coho salmon in water with turbidity levels as high as 100 NTU has been found to be at least 70 percent of their feeding success in clear water (Harvey and White 2008). During low flow restoration activities, adult salmon have been observed using the more turbid sections of the river (10 to 15 NTU) as protective cover during their spawning migrations through the Project areas (Gutermuth, pers. obs.). Finally, the Alaska Department of Environmental Conservation (2008) has determined that turbidity levels for protection of aquaculture in flowing conditions may not exceed 25 NTUs above natural conditions, and that this level is protective of fishery resources.

The Trinity River is typically very clear with natural background turbidity levels in the range of 0 to 1 NTU during summer low flow conditions. Due to the very low background concentrations during the summer, turbidity levels immediately downstream of the most carefully planned and implemented in-channel restoration activities will likely be increased by more than 20 percent above background levels, and plumes extending downstream of restoration activities may be visible. However, short-term increases in turbidity levels that occur during permitted restoration activities are generally not considered to be biologically detrimental to aquatic organisms; they are short in duration and fish are able to move away from the activity area. Reduction of these turbidity levels to within 20 percent above background is very expensive if not impossible using BMPs. Monitoring turbidity increases during implementation of previous Trinity River restoration projects has shown that periods of increased turbidity are brief (generally less than 24 hours); turbidity levels have not exceeded 50 NTU at monitoring points located 500 feet downstream and beneficial uses were still protected. In addition, the quantity of fine sediment introduced to the river during low flow restoration activities is typically small.

In contrast, sediment particles between 0.5 mm and 8.0 mm in diameter tend to settle more quickly. These larger sediment particles can decrease the permeability of the channel bed and cover spawning sites, causing negative impacts on the aquatic community (USFWS and HVT 1999). However, as long as the larger sediment particles are only mobilized into the water column from completed restoration activity areas and off-site sources during high flows, the larger sediment

particles will be transported far down-river or deposited on adjacent alluvial features (e.g., floodplains) where these particles contribute to riparian form and function (e.g., plant growth).

Post construction monitoring data from the Indian Creek site and the Canyon Creek suite of sites indicate that downstream turbidity levels may be increased by overland flow during the initial high flow events that occur following completion of construction activities. During high flow spring-time releases from Lewiston Dam (e.g., clear water released from the dam during ROD flows), turbidity levels may be increased by more than 20 percent at monitoring locations 500 feet or more downstream of recently completed channel rehabilitation sites. However, when the high flows are caused by natural storm water runoff in the Trinity River Basin, and the river is already carrying a substantial sediment load (e.g., turbidity greater than 40 NTUs), background levels are generally not increased by more than 20 percent at monitoring locations downstream of recently completed activities. Furthermore, during natural high flow events the relative addition of fine sediment from recently completed channel rehabilitation sites is minimal compared to the sediment load already being transported by the river (Gutermuth, pers. obs.). In both of these high flow scenarios, impacts to the Trinity River from the addition of TRRP related fine sediment is minimal because the materials that increase turbidity levels are maintained in suspension and transported downriver or deposited on the floodplain in the same manner as fine sediment from other sources. In both low flow and high flow scenarios, as long as Project related turbidity level increases are limited in concentration and duration, impacts to aquatic life and beneficial uses are expected to be minimal in comparison to the long-term aquatic habitat benefits that these Projects are designed to create.

Mercury

Another source of potential water quality impairment of the Trinity River is mercury. Although the river is not listed under Section 303(d) of the CWA for mercury impairment, elevated concentrations have been found in water, sediment, and biota (i.e., fish, frogs, and predatory aquatic insects) in the upper Trinity River Basin upstream of Lewiston Dam (USGS, unpublished data). The general significance of mercury as a biological toxin and the likely sources of mercury in regional and local contexts are discussed in Section 4.13, Hazards and Hazardous Materials, of the Trinity River Master EIR.

Early in the planning phases for the mechanical channel rehabilitation projects along the Trinity River, the TRRP recognized the possibility that mercury in placer tailings and/or fluvial fine sediments could be disturbed and mobilized by the rehabilitation activities. USGS monitoring suggests that the alluvial materials that are subject to project-related disturbance contain levels of mercury well below the numeric criteria promulgated by the EPA for priority toxic pollutants. Overall, the USGS assessment of site-specific methylation data suggests that the bioavailability of mercury in the Trinity River and its floodplain is not presently high and would not likely be modified by the Proposed Project.

3.5.2 Environmental Consequences/Impacts and Mitigation Measures

3.5.2.1 Methodology

For the past eight years, the TRRP has implemented a number of channel rehabilitation projects and completed similar activities to those proposed at the Proposed Project sites. While the type and intensity of these activities vary, the effects of the activities on water quality in the Trinity River are well understood. Impacts on water quality were determined by analyzing whether the proposed

modification of the physical features and biological conditions at the Proposed Project sites would comply with Basin Plan objectives for the Trinity River.

3.5.2.2 Significance Criteria

The Proposed Project would result in significant adverse impacts if it would result in any of the following:

- Violations of state or federal numerical water quality standards or state or federal narrative water quality objectives;
- Substantial degradation of water quality, such that existing beneficial uses are precluded specifically because of degraded water quality;
- Violation of any waste discharge requirements and/or Section 401 Certification conditions;
- Substantial alterations of the course of a stream or river in a manner that would result in substantial erosion or siltation onsite or offsite; or
- Violation of site-specific temperature objectives for the Trinity River contained in the Basin Plan (Regional Water Board 2011).

3.5.2.3 Impacts and Mitigation Measures

Table 9 summarizes the potential water quality impacts that would result from the No-Project and Proposed Project alternatives.

Table 9. Summary of Potential Water Quality Impacts for the No-Project and Proposed Project Alternatives

NO-PROJECT ALTERNATIVE	PROPOSED PROJECT	PROPOSED PROJECT WITH MITIGATION
Impact 3.5-1. Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction.		
No impact	Significant	Less than significant
Impact 3.5-2. Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction.		
No impact	Significant	Less than significant
Impact 3.5-3. Construction of the project could cause contamination of the Trinity River from hazardous materials spills.		
No Impact	Significant	Less than significant
Impact 3.5-4. Construction of the project could result in increased stormwater runoff and subsequent potential for erosion.		
No impact	Less than significant	Not applicable[1]
Impact 3.5-5. Construction and maintenance of the project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan.		
No impact	Significant	Less than significant

[1] Because this potential impact is less than significant, no mitigation is required.

Impact 3.5-1: Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no construction-related short-term increases in turbidity or total suspended solids levels would occur because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

The activities described in Chapter 2 for the Proposed Project would temporarily increase turbidity and total suspended solids in the Trinity River. The incorporation of design elements and construction criteria described in Appendix A (e.g., in-river construction, water pollution prevention, and construction schedules) are intended to limit the total addition of fine suspended sediment to the Trinity River. Additionally, river's edge and in-channel construction activities would be staged to minimize the potential turbidity effects. During in-channel construction activities, increases in turbidity levels could occur because of excavation of alluvial material. Connection of isolated and newly constructed side channels with the mainstem (e.g., the first flush of flowing water) would result in short-term increases in turbidity levels as this material is removed from and/or redistributed within the channel. Fine sediments may be suspended in the river for several hours following construction activities. The extent of downstream sedimentation would be a function of the size and mobility of the substrate. For example, fine-grained sediments like silts and clays can be carried several thousand feet downstream of construction zones, while larger-sized sediments like coarse sands and gravels tend to drop out of the water column within several feet of the construction zone. Collectively, the activities included in the Proposed Project could result in short-term increases in turbidity and suspended solids concentrations in the water column that could potentially violate the Basin Plan objectives for turbidity in the Trinity River. Short-term increases in turbidity and suspended solids levels during construction would be a significant impact.

The temporary crossings at the Douglas City site would provide access for in-channel work areas (IC-5 and IC-6) as well as access to river right work areas. At the Lorenz Gulch site, the X-1 low-flow channel crossing would provide access to river left work areas. The low-flow channel crossings would be constructed of appropriately sized alluvial materials. Placement of alluvial fill materials could temporarily increase turbidity and suspended materials during and immediately following crossing construction. Removal and distribution of alluvial materials upon deconstruction of the low-flow channel could also increase turbidity and suspended materials during and immediately following excavation.

MITIGATION MEASURES

Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction. Therefore, mitigation measures 4.5-1a, 4.5-1b, 4.5-1c, 4.5-1d, and 4.5-1e described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.5-2: Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no short-term increases in turbidity or total suspended solids levels would occur following construction because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

The character and location of alluvial features associated with the Trinity River were modified by the construction and operation of the TRD in response to changes in the flow and sediment regimes, particularly the loss of scouring associated with peak flows. Modification or reconstruction of these alluvial features at strategic locations would promote the river processes necessary for the restoration and maintenance of Trinity River alternate bars, thereby enhancing salmonid rearing habitat. These activities would also increase the habitat available for salmonid rearing under various flows.

Implementing the Proposed Project would increase turbidity and total suspended solids in the river and fluvial surfaces following construction. These increases in turbidity levels would occur when newly disturbed areas are exposed to elevated river stages during high river flows. Fine sediments may be suspended in the river for several hours following such exposure and erosion. The extent of downstream sedimentation would be a function of the rainfall intensity and/or instream flow velocity, as well as the particle size of exposed sediments. Lower intensity rainfalls would be unlikely to mobilize fine sediments because precipitation would be absorbed. If fine sediments are mobilized by flow over newly disturbed areas, they could be carried several thousand feet downstream of the activity areas, while larger sized sediments, such as sands and gravels, would tend to drop out of the water column within several feet of the activity areas.

Post-construction exposure of sediments to rainfall and/or flows would result in short-term increases in turbidity and suspended solids concentrations in the water column that could potentially be in violation of the Basin Plan turbidity objective for the Trinity River. A short-term increase in turbidity and suspended solids levels following construction would be a significant impact.

MITIGATION MEASURES

Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction. Therefore, mitigation measures 4.5-2a, 4.5-2b, and 4.5-2c described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.5-3: Construction of the Proposed Project could cause contamination of the Trinity River from hazardous materials spills.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no construction-related contamination of the Trinity River from spills of hazardous materials would occur because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

Construction staging activities could result in a spill of hazardous materials (e.g., oil, grease, gasoline, and solvents) into the Trinity River. In addition, operation of construction equipment in or adjacent to the river would increase the risk of a spill of hazardous materials into the river (e.g., from leaking of fluids from construction equipment). Spills of hazardous materials into or adjacent to the Trinity River could degrade water quality and have deleterious effects on salmonids of any life stage that are in close proximity to construction activities. Section 3.13, Hazards and Hazardous Materials, evaluates potential effects associated with exposing the public to hazards associated with the transportation and use of hazardous materials at the rehabilitation sites. Additional requirements outlined in Appendix A would be incorporated into the Project to reduce the potential impact. However, construction activities could result in a spill of hazardous material, which would be a significant impact.

MITIGATION MEASURES

Construction of the Proposed Project could cause contamination of the Trinity River from hazardous materials spills. Therefore, mitigation measures 4.5-3a, 4.5-3b, and 4.5-3c described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of these mitigation measures would reduce the impacts to less than significant.

Impact 3.5-4: Construction and maintenance of the Proposed Project could result in increased stormwater runoff and subsequent potential for erosion.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, there would be no increases in stormwater runoff and the potential for subsequent erosion because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

Implementation of the Proposed Project, including those measures described in Appendix A, would not result in an increase in impervious surface areas (e.g., structures and roadway approaches) that could subsequently generate additional stormwater runoff and potential for erosion. Grading activities, including the use of rippers during grading activities, are expected to eliminate surface runoff during the first year after construction. Access routes would be located on gentle terrain and would require minimal grading. The impact associated with runoff and erosion would, therefore, be less than significant.

Impact 3.5-5: Construction and maintenance of the Proposed Project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, no degradation of Trinity River beneficial uses would occur because the Project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

Under the Proposed Project, significant impacts to beneficial uses of the Trinity River could occur in the following categories of water quality objectives listed in the Basin Plan:

- Sediment;

- Toxicity;
- Turbidity;
- Settleable material;
- Suspended material; and
- Chemical constituents.

Under the Proposed Project, the impacts would be associated with in-channel work including the placement and deconstruction of the low-flow channel crossings (i.e., X-1, X-2, and X-3 at Douglas City and X-1 at Lorenz Gulch). Although the design elements and construction methods described in Appendix A are intended to minimize these impacts, the activities associated with construction, particularly in riverine and in-channel activity areas, would result in significant impacts.

MITIGATION MEASURES

Construction and maintenance of the Proposed Project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan. Therefore, mitigation measures identified above for Impacts 3.5-1, 3.5-2, and 3.5-3 and described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

3.6 Fishery Resources

This section describes the fishery resources and aquatic habitats that are known to occur within the boundaries of the sites and evaluates the impacts of the Proposed Project on these resources. The TRFEFR (USFWS and HVT 1999) determined that lack of spawning and rearing habitat for juvenile salmonids is likely a primary factor in limiting the recovery of salmonid populations in the Trinity River. Activities at the Proposed Project sites are specifically designed to increase the abundance of habitat for Trinity River salmonids by reconnecting the river with its floodplain, increasing channel sinuosity, and providing shallow low velocity habitats in close proximity to the river's edge. The discussion of fisheries resources is based on a focused literature review, informal consultation with resource agencies, and observations made during site visits. These resources are discussed in the Trinity River Master EIR (Section 4.6 and Appendix G). The Magnuson-Stevens Fishery Conservation and Management Act (MSA) and Essential Fish Habitat (EFH) are also described in the Master EIR (Section 4.6).

3.6.1 Affected Environment/Environmental Setting

3.6.1.1 Native Anadromous Fish Species

The native anadromous species of interest in the mainstem Trinity River and its tributaries are Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss irideus*) and Pacific lamprey (*Entosphenus tridentatus*). There are two spawning races of Chinook salmon (spring- and fall-run) and two spawning races of steelhead (winter- and summer-run). The life histories and fresh water habitat requirements of these and other species and their distinct spawning populations are described in Appendix G of the Trinity River Master EIR.

3.6.1.2 Resident Native and Non-Native Fish Species

Resident native fish species found in the Trinity River Basin include game fish such as rainbow trout (*Oncorhynchus mykiss*) and non-game fish such as speckled dace (*Rhinichthys osculus*), Klamath